



GREENPARK MASTERPLAN 2020

Former Greenpark Racecourse, Limerick



Prepared for:

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1.0 INTRODUCTION

The Greenpark (former racecourse) lands comprise a 47 ha strategically important urban landholding located to the south-west of Limerick City Centre. The lands are currently subject to a number of different land use zoning objectives in the *Limerick City Development Plan 2010-2016* (as extended) including residential, mixed use, neighbourhood centres, public open space and sports grounds. The lands are also partly identified as being in Flood Zone A on the Development Plan's Flood Risk Map and are subject to a number of proposed road and cycleway objectives as identified in the Plan.

A review of the overall landholding's planning history confirms that both the Planning Authority and An Bord Pleanála have consistently strongly recommended the preparation of a Masterplan in relation to the overall landholding is required to guide and inform its future development in a coherent manner. In this regard, an architectural Masterplan was prepared on the landowner's behalf and discussed at a high level with Limerick City and County Council (LCCC) in 2018.

This 2020 Masterplan (referred to as the *Greenpark Masterplan 2020*) was prepared by Tom Phillips + Associates, Town Planning Consultants in association with the landowner and a multi-disciplinary team and goes significantly beyond just an architectural vision and provides a range of site wide assessments including planning; hydrology and hydrogeology; drainage; traffic and transportation; biodiversity; landscape; design; flood risk and indicative phasing. This will take the form of a written statement to accompany the Masterplan vision for the lands and will serve as a robust basis for future planning applications, as the various phases of development are brought forward through the planning system. The Masterplan will, by its nature, be an evolving document and will require some flexibility to respond to both changing planning parameters and market conditions. The current Greenpark Masterplan illustrates a mixed use development vision for the lands consisting of an office campus (39,500 sq m); 831 no. residential units (including houses, duplexes and apartments); neighbourhood centre; nursing home (120 no. beds); crèche and open space provision with related car parking, ancillary services and roads infrastructure including indicative access arrangements and internal roads and pedestrian/cycle links through the site.

As noted above, the lands are identified as being subject to flood risk, which is considered to be a key planning parameter in respect of the future development of the entire lands. As such, a full site wide flood risk mitigation strategy was prepared by RPS Consulting and forms part of this Masterplan. This includes recommended proposals to fill parts of the lands as necessary to facilitate the planning and construction of future development, together with the incorporation of a range of other flood defence measures. The outcome of this strategy was then used to inform the current architectural and engineering vision for the lands in respect of issues such as finished floor levels and topography; the interface between proposed flood defence measures and urban design and the siting of land uses on the lands.

It is anticipated that the phased development of the lands will be progressed in the context of the Masterplan through a series of planning applications.

This document has been prepared by a multidisciplinary team, coordinated by Tom Phillips + Associates. The table below provides an overview of the various chapters contained within the document, together with the author(s) of each chapter.

CHAPTER	CONTENT	CONTRIBUTOR(S)
1.0	Introduction	Tom Phillips + Associates (TPA)
2.0	Site Location and Context	TPA
3.0	Planning Context	TPA
4.0	Infrastructure Strategy – Flood Risk	RPS
5.0	Water and Hydrology	Punch Consulting Engineers, RPS
6.0	Traffic and Transportation	Punch Consulting Engineers
7.0	Biodiversity Strategy	Ecology Ireland
8.0	Landscape and Amenity Strategy	Murray + Associates
9.0	Masterplan and Design Principles	Lafferty, Reddy A+U

2.0 SITE LOCATION AND CONTEXT

The c. 47 ha subject site is situated approximately 2 km to the south-west of Limerick City Centre and south of the River Shannon. The site generally comprises an extensive open area of the former Greenpark Racecourse (now re-located). The site is generally bounded by Ballinacloyh River to the west and south-west and surrounding lands including the Greenpark Greyhound Racing Stadium; Dock Road and industrial buildings to the north-west and existing clustered student accommodation and residential development to the south-east and east.

The overall landholding can be accessed from two existing points, one via an existing gated entrance in the Log na gCapall residential estate to the south, which is accessed off South Circular Road, and ultimately the Ballinacurra Road (R526). The other is via the Dock Road to north of the site, via an access road, which has a shared roundabout with the Limerick Greyhound Stadium. An additional potential access point via an existing roundabout at Ashdown to the east, near Alandale Square, may be provided at a future date and forms part of the overall Masterplan vision for the Greenpark lands.

The site is located within easy reach of O'Connell Avenue, which is an important arterial route in and out of Limerick City Centre. In terms of this Masterplan, the primary vehicular access to the lands is intended to be via the Dock Road, which is an important route in terms of Limerick City, with secondary vehicular access serving some limited residential development via Greenpark Avenue and the proposed nursing home via Log na gCapall. Cycle and pedestrian access will also be provided from Greenpark Avenue and Log na gCapall.

This area of the City is well serviced with a variety of primary and secondary schools and Mary Immaculate College, a third level institution, is also located in close proximity to the site. Public transport facilities service this area of Limerick, with the bus routes No. 13, 14, 301, 304, 304A, 304X, 315, 320, 321 and 435 available nearby on Ballinacurra Road.

The re-location of the racecourse has facilitated the potential re-development of these lands in line with the provisions and land use zoning as set out in the current Limerick City Development Plan e.g. office campus, housing (including crèche), nursing home, neighbourhood centre and open space.

The Greenpark site comprises a strategic landholding located within close proximity of the city centre and with strong transportation links to the M7 motorway and Shannon Airport, Cork, Galway and the wider Mid-West region.

This Masterplan was developed in line with these objectives and proposes a range of diverse and active uses to reinforce the social and economic core of the city through the creation of significant employment and the delivery of substantial residential accommodation with associated social infrastructure over the next 10-15 years.



Figure 2.1: Site Location



Figure 2.2: Aerial View of Site

3.0 PLANNING CONTEXT

3.1 National Planning Policy Overview

There have been a number of recent national planning policy changes that would promote a more intensive approach to the development of this site. The relevant provisions are described below.

3.1.1 The National Planning Framework 2018 (NPF)

The *National Planning Framework* (NPF) is the Government's plan to cater for the extra one million people that will be living in Ireland, the additional two thirds of a million people working in Ireland and the half a million extra homes needed in Ireland by 2040.

The Framework focuses on:

- Growing regions, their cities, towns and villages and rural fabric;
- Building more accessible urban centres of scale and
- Better outcomes for communities and the environment, through more effective and coordinated planning, investment and delivery.

Under the heading of 'Compact Growth', the NPF is:

'Targeting a greater proportion (40%) of future housing development to happen within and close to existing built-up areas. Making better use of under-utilised land, including 'infill' and 'brownfield' and publicly owned sites together with higher housing and jobs densities, better serviced by existing facilities and public transport.'

The NPF targets a significant proportion of future urban development on infill/brownfield development sites within the built envelope of existing urban areas. This is applicable to all scales of settlement, from the largest city, to the smallest village.

The NPF further notes in National Policy Objective 10:

'There will be a presumption in favour of development that encourages more people, jobs and activity within existing urban areas, subject to development meeting appropriate planning standards and achieving targeted growth.'

The premise of development at this location complies with the overarching themes of the NPF, if proposing a well-designed sustainable form of mixed-use and residential development on an existing, underutilised site located in close proximity to high quality public transport services and a well-established social infrastructure that will contribute to the consolidation of Limerick.

The NPF provides a detailed narrative on the Government's aspirations for Limerick and the Mid-West Region. The NPF states:

"As a well-located regional centre situated mid-way between Cork and Galway on Ireland's Atlantic Economic Corridor and with good connectivity to Dublin, Limerick has the potential to generate and be the focus of significant employment and housing growth. It is necessary for Limerick to

further strengthen its position as the principal focus within the Region and to continue to address the legacy of regional growth having occurred outside the City area."

The NPF continues:

"A series of innovative, practical and institutional measures have been put in place to achieve this in recent years and there is evidence of a positive turnaround in terms of both population and employment growth. Limerick Regeneration, the amalgamation of Limerick City and County and most recently, the Limerick 2030 initiative, have all contributed to enhancing Limerick's growth potential. Working together with the City's third level institutions, Shannon Airport and bodies such as Shannon Development and the Shannon-Foynes Port Company, there is capacity to build on recent successes and add to the ambitious vision for Limerick."

Several of the key future growth enablers for Limerick, identified in the NPF are particularly relevant when considering any proposed development at this location. These include:

- Identifying infill and regeneration opportunities to intensify housing and employment development throughout inner suburban areas;
- Enabling enhanced opportunities for existing communities as development and diversification occurs, particularly through employment, learning and education support;
- The continued expansion of the City's third level institutions and integration with the wider City and region.¹

3.1.2 National Policy Objectives

The NPF outlines National Policy Objectives, which set out broader aspirations for national and regional planning. Several of these are relevant when considering the potential development at this subject site.

These include:

- **National Policy Objective 5** - Develop cities and towns of sufficient scale and quality to compete internationally and to be drivers of national and regional growth, investment and prosperity
- **National Policy Objective 6** - Regenerate and rejuvenate cities, towns and villages of all types and scale as environmental assets, that can accommodate changing roles and functions, increased residential population and employment activity and enhanced levels of amenity and design quality, in order to sustainably influence and support their surrounding area.
- **National Policy Objective 7** - Apply a tailored approach to urban development, that will be linked to the Rural and Urban Regeneration and Development Fund, with a particular focus on:- Dublin; the four Cities of Cork, **Limerick**, Galway and Waterford; Strengthening Ireland's overall urban structure, ... Encouraging population growth in strong employment and service centres of all sizes, supported by employment growth; Reversing the stagnation or decline of many smaller urban centres, by identifying and establishing new roles and functions and enhancement of local infrastructure and amenities; Addressing the legacy of rapid unplanned growth, by facilitating amenities and services catch-up, jobs ... In more self-contained settlements of all sizes, supporting a continuation of balanced population and employment growth.

¹ Project Ireland 2040 - The National Planning Framework, p 51.

- **National Policy Objective 11** - *In meeting urban development requirements, there will be a presumption in favour of development that can encourage more people and generate more jobs and activity within existing cities, towns and villages, subject to development meeting appropriate planning standards and achieving targeted growth.*
- **National Policy Objective 28** - *Plan for a more diverse and socially inclusive society that targets equality of opportunity and a better quality of life for all citizens, through improved integration and greater accessibility in the delivery of sustainable communities and the provision of associated services.*

The NPF notes that Limerick has the potential to generate and be the focus of significant employment and housing growth to 2040. It is necessary for Limerick to further strengthen its position as the principal focus within the Region and to continue to address the legacy of regional growth having occurred outside the City area. This requires growing and diversifying the City's employment base and attracting more people to live in the City, both within the City Centre and in new, accessible green-field development areas. This means improving housing choice, supported by facilities and infrastructure.

3.1.3 Sustainable Residential Development in Urban Areas – Guidelines for Planning Authorities (2009)

These Guidelines provide national guidance in relation to the appropriate locations for the siting of higher density residential development, having regard to the locational characteristics of the lands in question. In this regard, it is considered that the subject lands comprise "Outer Suburban/Greenfield" lands given the nature and location of the site.

Section 5.11 of the Guidelines states the following regarding outer suburban/greenfield sites;

"These may be defined as open lands on the periphery of cities or larger towns whose development will require the provision of new infrastructure, roads, sewers and ancillary social and commercial facilities, schools, shops, employment and community facilities. Studies have indicated that whilst the land take of the ancillary facilities remains relatively constant, the greatest efficiency in land usage on such lands will be achieved by providing net residential densities in the general range of 35-50 dwellings per hectare and such densities (involving a variety of housing types where possible) should be encouraged generally. Development at net densities less than 30 dwellings per hectare should generally be discouraged in the interests of land efficiency, particularly on sites in excess of 0.5 hectares." [Our Emphasis]

The site, however, is also in close proximity to an established public transport corridor, which is assessed under Section 5.8 of the Guidelines, which state:

"Walking distances from public transport nodes (e.g., stations/halts/bus stops) should be used in defining such corridors. It is recommended that increased densities should be promoted within 500 metres walking distance of a bus stop, or within 1 km of a light rail stop or rail station. The capacity of public transport (e.g., the number of train services during peak house) should also be taken into consideration in considering appropriate densities..."

In general, minimum net densities of 50 dwellings per hectare, subject to appropriate design and amenity standards, should be applied within public transport corridors, with the highest densities being located at rail stations / bus stops, and decreasing with distance away from such nodes."

In our opinion, on the basis of national policy and the assessment of the adjoining site, we would suggest a residential density range of 40-47 units per ha may be achievable on the lands, subject to planning parameters. This density range has informed the residential aspect of the Draft Masterplan layout as described in Chapter 9 below.

3.1.4 Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities (March 2018)

These guidelines seek to promote high density apartment development on residentially zoned land in appropriate locations in line with the above referenced NPF overarching policies in relation to encouraging residential development within existing urban settlements.

It is considered that that the residential lands would be classified as being an 'Intermediate Urban Location' as per these Guidelines, which would require overall densities in the order of 45 units per ha. The lands are a c.35 minute walk from Limerick City Centre (taking AIB O'Connell Street as the focal point) and a 25-30 minute walk from the beginning of the area zoned city centre in the Development Plan (Alphonsus Street). This is significantly in excess of the recommended 15 minute walking distance in the Guidelines.

In terms of significant employment locations, which is a further criterion, the lands are similarly not within 15 minutes walking distance of 'significant employment locations'. (Mary Immaculate College, a third level institution, is c. a 17-23 minute walk and, in any event, would not be categorised as a 'significant' employer and University Hospital Limerick is a c. 25 minute walk away.) Regarding public transport accessibility, the site is not within the identified reasonable walking distance (10 minutes) of any high capacity urban public transport stops (rail, tram, etc) and is not within easy (5 minutes) walking distance of high frequency urban bus services. The nearest bus stop is 10 mins walk away with a week day 15 minute minimum frequency, which is above the minimum 10 minute peak hour frequency required in the guidance. In our view, therefore, applying the criteria objectively, the site cannot be classified as a Centrally Accessible Urban Location as per the Apartment Design Guidelines.

Taking the Intermediate Accessible Location criteria, as noted above, the site is not within a 10 minute walk of any major centres of employment. Dock Road, based on our estimates of employment levels in that area, would not be considered a significant employment location in the context of justifying high density residential development. As also noted above, the site is not within walking distance (10-15 minutes) of high frequency public transport/urban bus services, nor is it within a 5 minute walking distance of reasonably frequent urban bus services (minimum 15 minutes peak hour frequency). The site is within 10 minutes walking distance of such a bus service. In our opinion, therefore, whilst not meeting the Intermediate Location criteria in full, the subject lands are a closer fit in respect of proximity to some employment located along Dock Road and a bus service operating at a 15 minute frequency. On that basis, the site can be more accurately categorised as being an Intermediate Accessible Urban Location, which suggests overall densities of c. 45 units per ha.

The Guidelines also provide new apartment design standards that supersede Development Plan provisions in relation to:

- Apartment mix;
- Internal space standards;
- Dual aspect ratios;
- Floor to ceiling heights;

- Apartment to stair/lift ratios;
- Storage spaces;
- Amenity spaces including balconies and patios;
- Car parking, and
- Room dimensions.

It is considered that future residential development on the site would adhere to all relevant design standards.

Section 2.23 of the Guidelines note that publication of *The National Planning Framework* has signalled a move away from rigidly applied, blanket planning standards in relation to building design, in favour of performance-based standards to ensure well-designed high-quality outcomes. In particular, general blanket restrictions on building height or building separation distance that may be specified in Development Plans, should be replaced by performance criteria, appropriate to location.

3.1.5 *The Urban Development and Building Heights Guidelines for Planning Authorities, (December 2018)*

These Guidelines adopted in December 2018 seek to provide further guidance on building height as signalled in the above referenced *National Planning Framework* and above referenced *Apartment Guidelines*. These reiterate much of the ‘compact growth’ policy set out in the NPF and note that “...increasing prevailing building heights therefore has a critical role to play in addressing the delivery of more compact growth in our urban areas, particularly our cities and large towns...”

Section 2.6 of the Height Guidelines notes that;

“...statutory development plans have tended to set out overly restrictive maximum height limits in certain locations and crucially without the proper consideration of the wider planning potential of development sites and wider implications of not maximising those opportunities by displacing development that our wider society and needs to other locations that may not be best economy placed to accommodate it.”

Section 3.0 of the Guidelines in relation to building height and the development management process state that ‘there is therefore a presumption in favour of buildings of increased height in our town/city cores and in other urban locations with good public transport accessibility’.

These Guidelines identify a number of potential development management/performance criteria to be assessed in respect of increased height including:

- Accessibility to public transport;
- A Landscape and Visual Impact Assessment;
- The contribution to positive place-making and the creation of visual interest in the streetscape;
- The avoidance of long uninterrupted walls of building in the form of perimeter blocks or slab blocks;
- Access to Sunlight and Daylight;

- Micro-climatic impacts;
- Relevant environmental assessments including AA Screening and Ecological Impact Assessment.

All future planning applications within the Masterplan boundary will have due regard, as relevant, to the above criteria.

3.2 Regional Planning

3.2.1 *Regional Spatial and Economic Strategy (RSES) for the Southern Region*

As per the *Local Government Reform Act 2014*, the Southern Regional Assembly is responsible for preparing a *Regional Spatial and Economic Strategy (RSES)* for the Southern Region. Each of the three Regional Assemblies have prepared their own RSES which will provide a long-term regional level strategic planning and economic framework in support of the implementation of the *National Planning Framework*.

The Southern Regional Assembly has prepared a draft RSES for the Southern Region covering 2019-2031. The RSES provides a long-term regional level strategic planning and economic framework, to support the implementation of the *National Planning Framework*, for the future physical, economic and social developments for the Southern Region. Clare, Limerick and much of Tipperary comprise the Mid-Western regional area under the Southern Regional Assembly, focused on Limerick City and the River Shannon estuary, also extending into the northern part of Co. Kerry. A Metropolitan Area Strategic Plan (MASP) will be prepared for the Limerick Metropolitan area, incorporating Shannon, through the Regional Spatial and Economic Strategy process.

3.3 Local Planning Policy

3.3.1 *Limerick City Development Plan 2010-2016, including Limerick 2030*

The Limerick City Development Plan (LCDP) 2010-2016 sets out Limerick City Council’s policies for the development of Limerick City to 2016 and beyond. The plan was amended with Variations that came into effect in May 2017. As set out in the *LCDP 2010-16*, the vision for Limerick City is to continue to grow as the centre of economic, social and cultural development for the Mid-West Region.

Variation number 4 to the *Limerick City Development Plan 2010 – 2016*, was adopted in January 2015 and comprised of the incorporation of the *Limerick 2030 Economic and Spatial Plan* into the LCDP. The Limerick 2030 Plan sets out the medium-term and long-term strategy for the development of Limerick City and County for the next 15 years.

The *Development Plan* notes that the subject site represents one of the largest remaining undeveloped land banks in the City, which when integrated with the adjacent Allendale developments and the small neighbourhood centre, represents the newest housing area in the City (Section 14.6 of the *Development Plan, Area Profile on “South Circular Road/Ballinacurra.”*)

Developed open space and recreational facilities are limited in the City, but there is a significant green land bank incorporating the Baggott Estate and the subject site to service the area with the sporting clubs located at Portland Park, Catholic Institute and Young Munster RFC. Key issues identified in the course of

preparing the *Development Plan* strategy in this location, are the proposed Green Routes, the development of open space, the impact of school traffic in the area, as well as general traffic congestion.

The *Development Plan* further notes that the potential development of the subject site is also of concern to the existing residents of the area. The City Council will be guided by the following specific objectives in relation to the South Circular Road/Ballinacurra Area;

- To protect the existing architectural heritage of the area by creating architectural conservation areas.
- To provide adequate public transportation infrastructure (green routes) in the area through negotiation with the stakeholders of the area;
- To examine means of reducing traffic congestion at peak times through more sustainable and coordinated school mobility planning;
- To support the continuing development of Mary Immaculate College in a manner that does not adversely impact of the amenities of the area;
- To seek the relocation of the Seveso Site activities out of the area. Tank Farm, Courtbrack Avenue and Grassland Fertiliser, Dock Road;
- To support the development of the docklands as a major employment zone in the City;
- To sustainably develop the Baggott Estate and the open space area in the former race course lands in a coordinated manner for recreational purposes both passive and active;
- To ensure that the residential amenities of those residences along the southern ring road are not adversely impacted;
- To ensure that the regeneration programmes do not adversely impact on the amenities of the area;
- To ensure an appropriate mix of uses in the area to support the primary residential function of the area these include specific supports for the population of the area;
- To seek the balanced development of the existing under-utilised lands in the area in particular the former racecourse lands;
- To seek that the contribution of the former race course to the cultural and sporting history of the city is commemorated in the development of the lands and
- To ensure the provision of infrastructure appropriate to the needs of the area.

In addition, the Plan notes that the c. 36 ha of undeveloped, zoned land at the former race course could release 1,188 residential units.² This is expanded further in the extract of the following table;

Table No. 2.5 Core Strategy															
LIMERICK CITY CORE STRATEGY POPULATION LAND USE AND HOUSING UNIT REQUIREMENTS 2010-2022	2006 Population	2016 Population	2022 Population	Phase 1 House No. Units Required by 2016 based on Households of 2.4	Phase 2 House No. Units Required by 2022 based on Households of 2.4	Total House No. of Units required by 2022 based on households of 2.4	Phase 1 Land to be zoned in Hectares 2016	Phase 2 Land to be zoned in Hectares 2022	Total Land to be zoned in Hectares by 2022	90% of Housing Units (MWRA RFGs 2010-2022 *) @ 35 housing units per hectare of 168.5 hectares	10% of Housing Units (MWRA RFGs 2010-2022 *) @ 22 housing units per hectare of 168.5 hectares	Excess /Shortfall Zoned Lands 2016 Ha's	Excess /Shortfall Zoned Lands 2022 Ha's	Total Excess /Shortfall Units 2016	Total Excess /Shortfall Units 2022
Limerick City	99,790	79,768	81,240	9,149	4,364	13,513	272	135	407			-1.16	2.52	20	143
Increase	10,978	10,472													
Regeneration		4800	5760	2,000	2,400	4,400	60.6	72.4	133.0						
Zoned Undeveloped Housing Lands *1															
Coomagh/Cloondraugh		1,638	1051	674	438	1,112	20	15	35						
Clonsilla		1212	566	540	236	776	16	7	23						
Former Racecourse		1778	1132	741	472	1,213	22	14	36						
Corbally		648	0	270	0	270	8	0	8						
Balance		4448	1082	1853	455	2,308	55	13.5	68.5						
MIXED USE / BROWN FIELD *2															
City Centre		3636	607	1516	253	1769	45	7.5	52.5			4.24			
Remaining Mixed use including Brownfield/Derelict Sites		3636	607	1516	253	1769	45	7.5	52.5						
Total		21,790	10,815	9,110	4,597	13,617	272	135	407						

Notes:
 *1 Residential Land Bank potential 168.5 hectares
 Total Units = 5,676 units
 *2 Mixed Use /Brownfield 105 hectares
 94.5ha x 35 units= 3307 units
 10.5ha x 22 units = 231 units
 Total units =5,536

Figure 3.0: Extract of Table No. 2.5 (Core Strategy) of the Limerick City Council Development Plan 2010-2016³



Figure 3.1: Photograph taken from south-eastern end of the site, near Greenpark Avenue (TPA, 2019)

² Table 2.4 – Undeveloped Zoned Housing Land Limerick City Council Development Plan 2010-2016

³ We note that the figures used in Extract of Table No. 2.5 of the Core Strategy are different to those referenced in footnote No. 3. It is unclear how LCCC calculated these, or why these may be different, but both are referenced above for completeness.

3.3.2 Zoning Objectives

The subject site, outlined indicatively in yellow in Figure 3.1 depicts an extract of the land use zoning map of the *Limerick City Development Plan 2010-2016*. The following are the land use zoning objectives pertaining to the site;

- **Zoning Objective 2A – Residential** (light pink) - *To provide for residential development and associated uses.*
- **Zoning Objective 5A – General Mixed Use** (dark pink) - *To promote the development of mixed uses that serves an area greater than its immediate catchment and to ensure the creation of a vibrant and sustainable urban area. The primary purpose of this zoning is to provide for a range of employment and related uses. Permissible uses within this zone includes general offices, conference centre, third level education, hospital, hotel, commercial leisure, cultural, residential, public institutions, childcare services, business and technology/research uses (including software development, commercial research and development, publishing, information technology, telemarketing, data processing and media activities), light industrial uses and in addition, local convenience stores/corner shops and community/civic uses. Residential uses are also permitted.*
- **Zoning Objective 5C – Neighbourhood Centres** (light blue)- *To protect, provide for and/or improve the retail function of neighbourhood centres and provide a focus for local services. The primary purpose of these centres is to fulfil a local shopping function, providing a mix of convenience shopping, lower order comparison shopping, and local services to residential and employment areas. Some of these centres need to be enhanced significantly in terms of their retail offering, mix of uses, public realm, and overall viability and vitality. Limited retail offices will be acceptable in these centres to serve local needs and are subject to restrictions on size and extent including a cap of 100 sqm per unit. Residential uses are also acceptable within this zone.*
- **Zoning Objective 6A – Public Open Space** (Dark Green) - *To retain all land dedicated for public open space.*
- **Zoning Objective 6B – Sports Grounds** (Brown) - *To protect, retain and enhance the range and quality of sports facilities and grounds. The sports grounds objective protects the City’s sports grounds and there will be a presumption against the loss of land zoned sports ground to other forms of development. Only development that is ancillary to/supports the principle use of the site for sports and which will only affect lands incapable of forming part of the playing pitches, will be considered in these areas. Ancillary uses include other sport and leisure facilities such as a clubhouse, changing rooms, meeting rooms, a gym, sports training halls, catering facilities, caretaker accommodation and appropriate car parking facilities. Ancillary offices, crèches and community uses are open for consideration, provided they are linked to the sports use.*

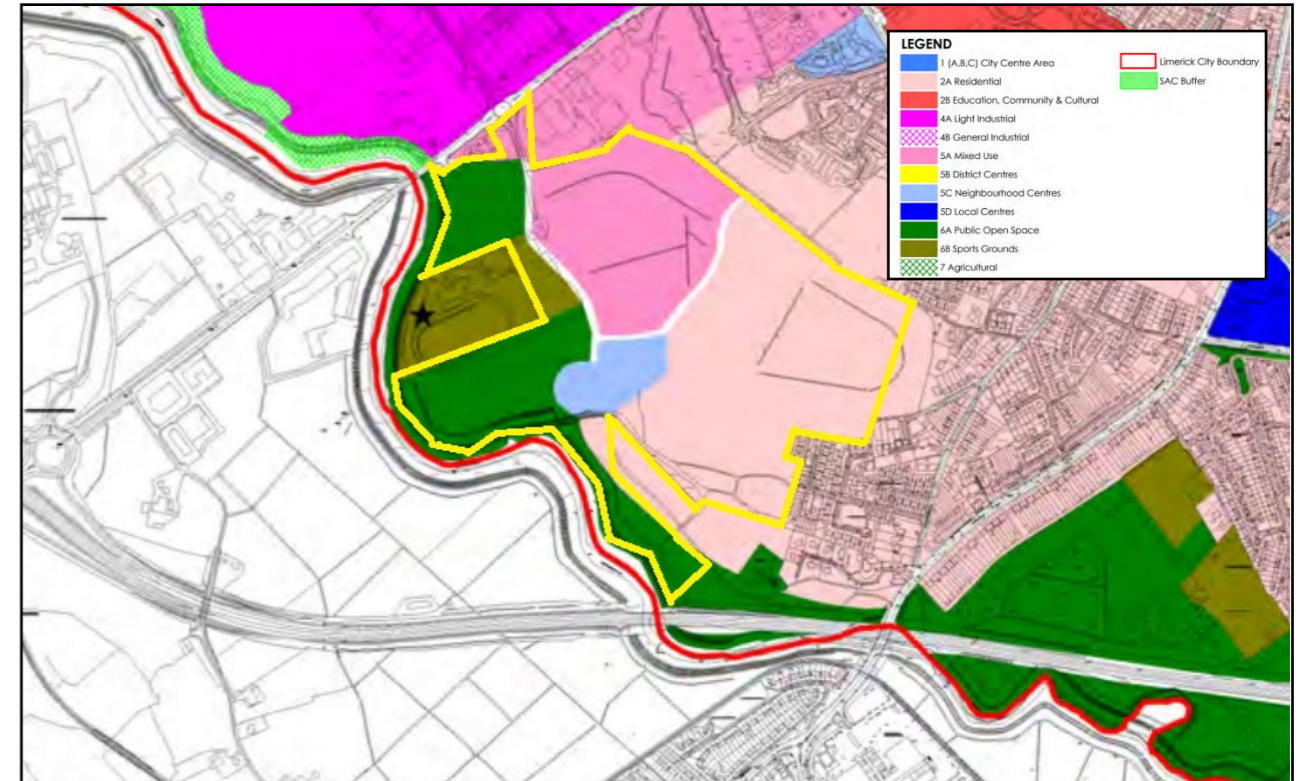


Figure 3.2: Extract of Land Use Zoning Map, with indicative site boundary in yellow, *Limerick City Council Development Plan 2010-2016*. Cropped and annotated by TPA, 2020.

3.3.3 Additional Mapped Objectives of the Development Plan

The subject site and its environs are included in a number of additional mapped objectives within the *Development Plan*. These vary from environmental designations to future infrastructure provision. The relevant mapped objectives are noted in the figures below.

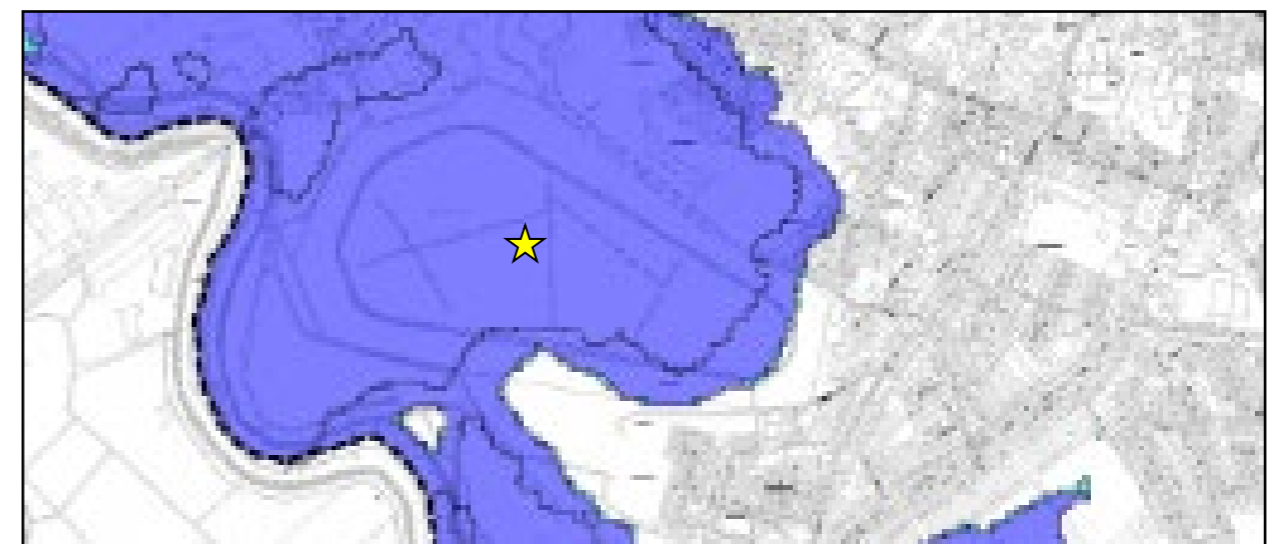


Figure 3.3: Extract of Map No. 2 of the *Limerick City Council Development Plan 2010-2016*, 'Flood Risk Map.' Site is indicated with a yellow star. The dark blue area is indicated as 'Flood Zone A.' Cropped and annotated by TPA, 2020. The assessment of potential flood risk and mitigation measures is outlined in greater detail in the flood risk strategy, prepared by RPS.

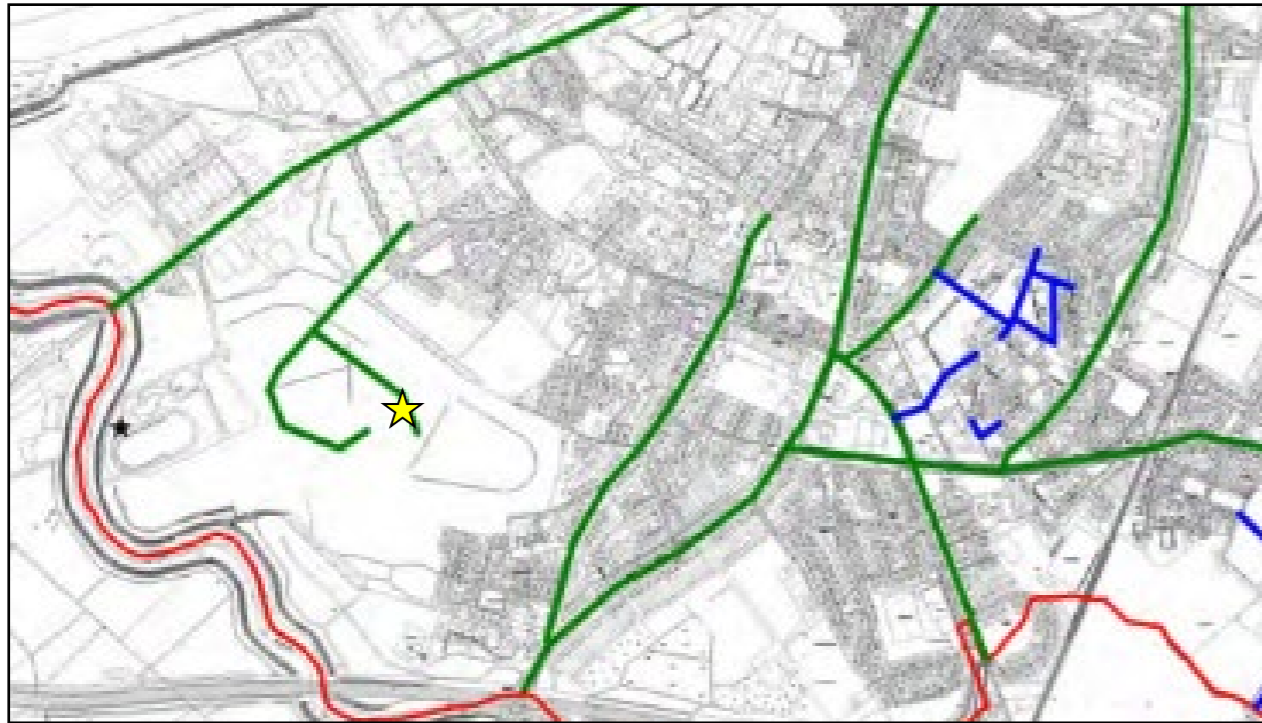


Figure 3.4: Extract of Map No. 3 of the *Limerick City Council Development Plan 2010-2016, 'Road Objectives Map.'* Site is indicated with a yellow star. The green line transecting the site is indicated as 'Road Improvements.' Cropped and annotated by TPA, 2020.

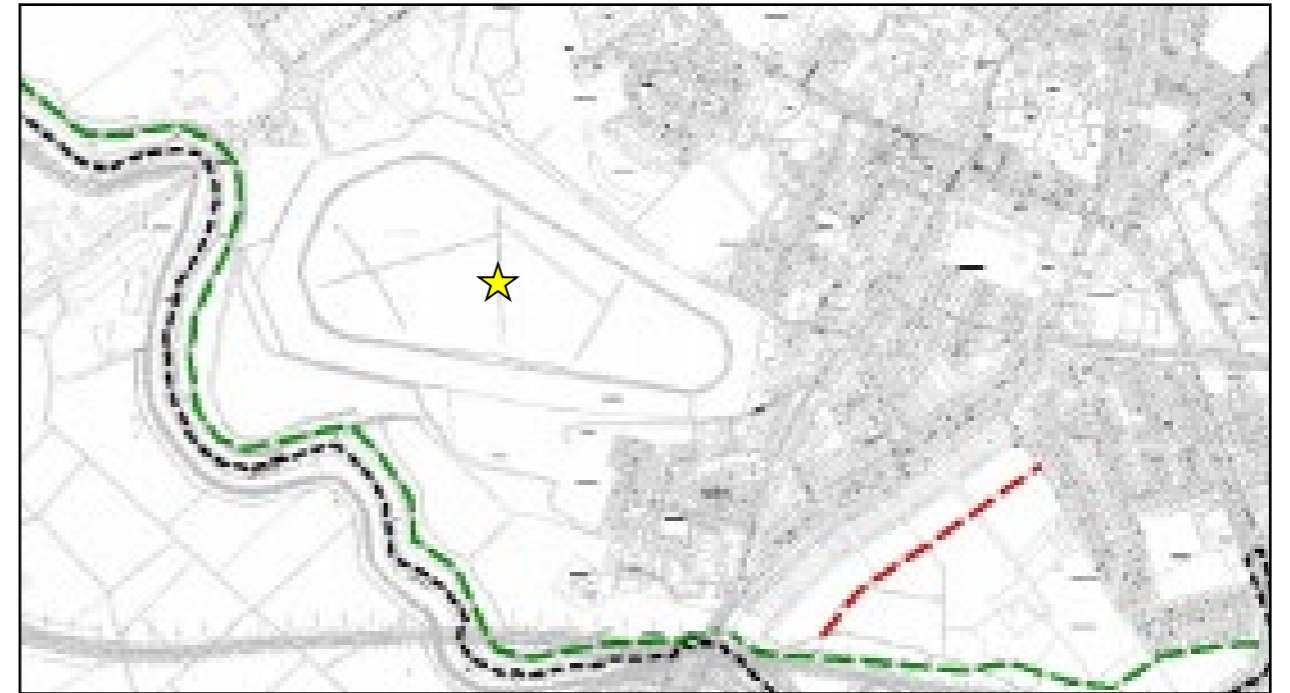


Figure 3.6: Extract of Map No. 3D of the *Limerick City Council Development Plan 2010-2016, 'Public Footways Map.'* Site is indicated with a yellow star. The green dashed line running parallel to the border of the site to the south is indicated as 'Public Right of Way - OPW.' Cropped and annotated by TPA, 2020.

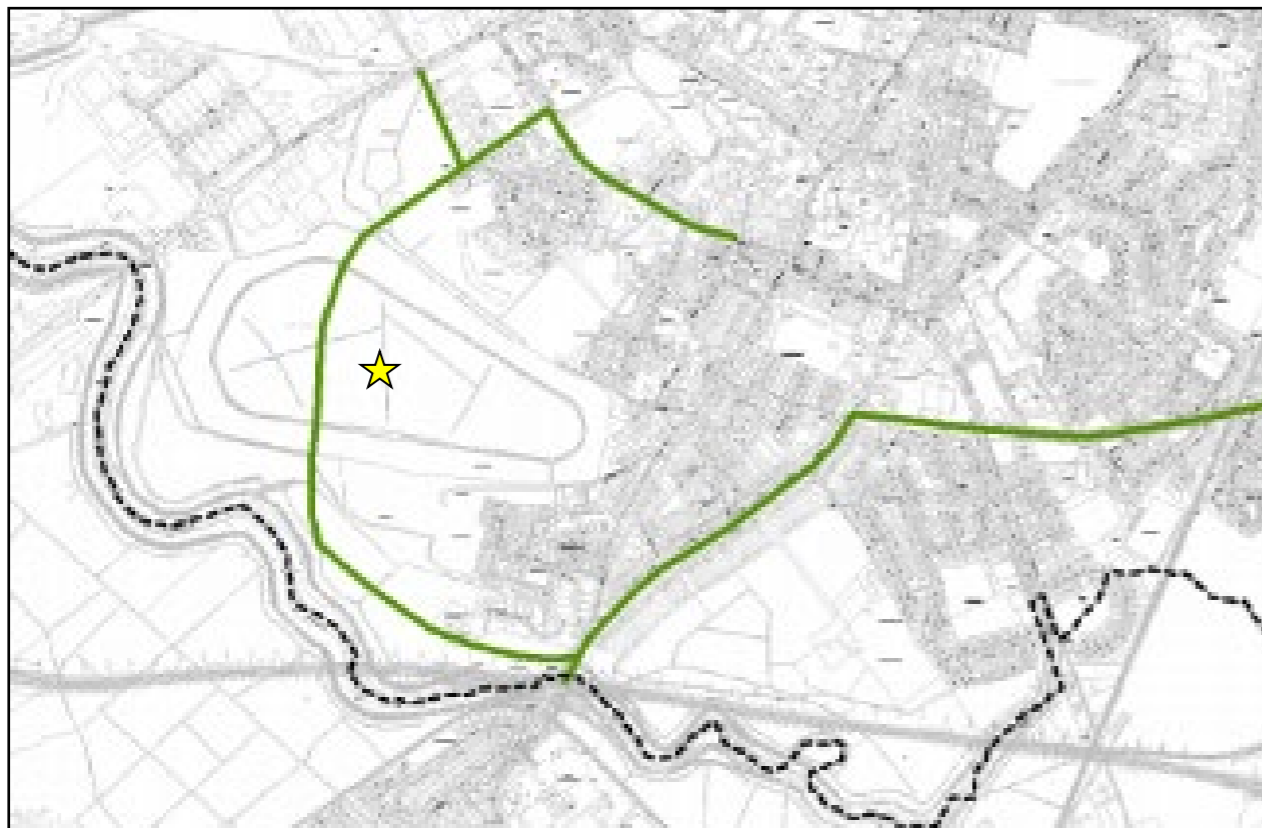


Figure 3.5: Extract of Map No. 3B of the *Limerick City Council Development Plan 2010-2016, 'Cycle Ways Map.'* Site is indicated with a yellow star. The green line transecting the site is indicated as 'Proposed Cycle Ways.' Cropped and annotated by TPA, 2020.

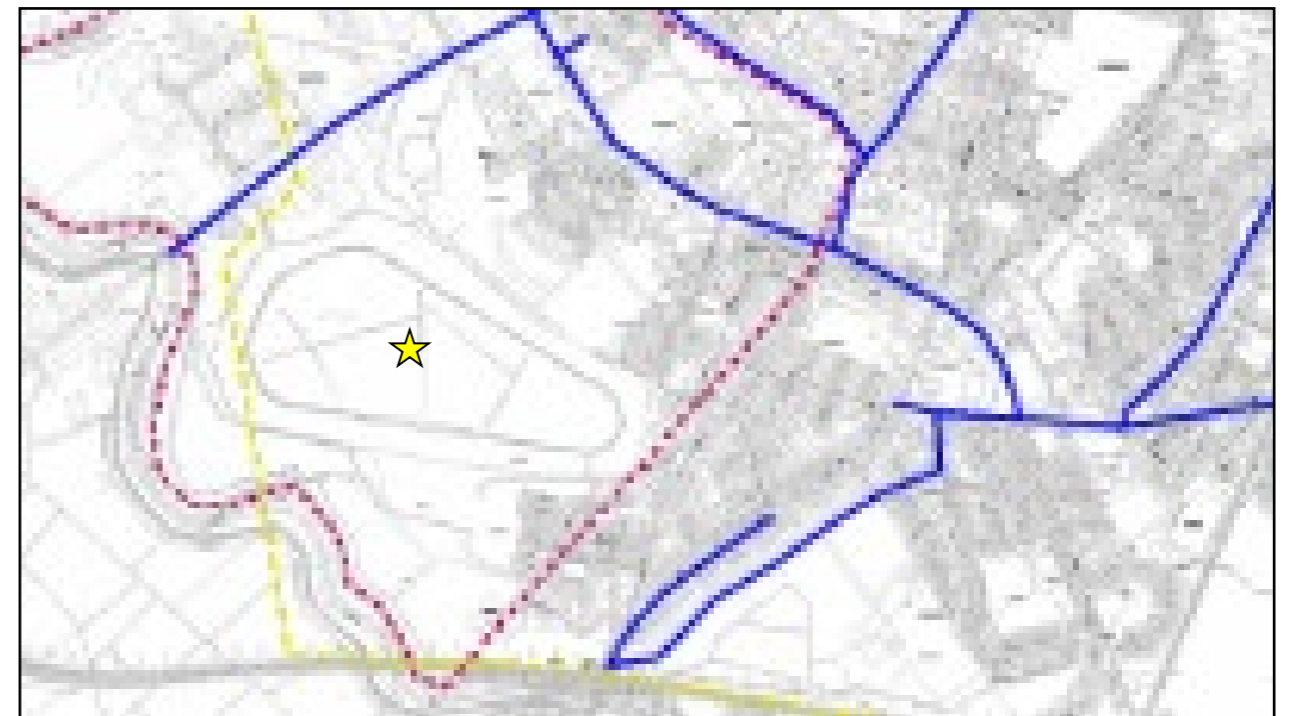


Figure 3.7: Extract of Map No. 4 of the *Limerick City Council Development Plan 2010-2016, 'Water Services Objectives Map.'* Site is indicated with a yellow star. The pink dashed line indicates 'Restict discharges of stream water into combined drainage areas where there is a potential for a developer to install a discharge to a water course or if the combined drainage system is at or near full capacity. The level of discharge by be 21/sec/hect.' The yellow dashed line indicates 'complete and commission the installation of the southern ring trunk main infrastructure around the city to service the north city ensuring all strategic spurs are complete' and the blue line indicates existing 'potable trunk water main.' Cropped and annotated by TPA, 2020. The assessment of existing site services is outlined in greater detail in the chapters below.

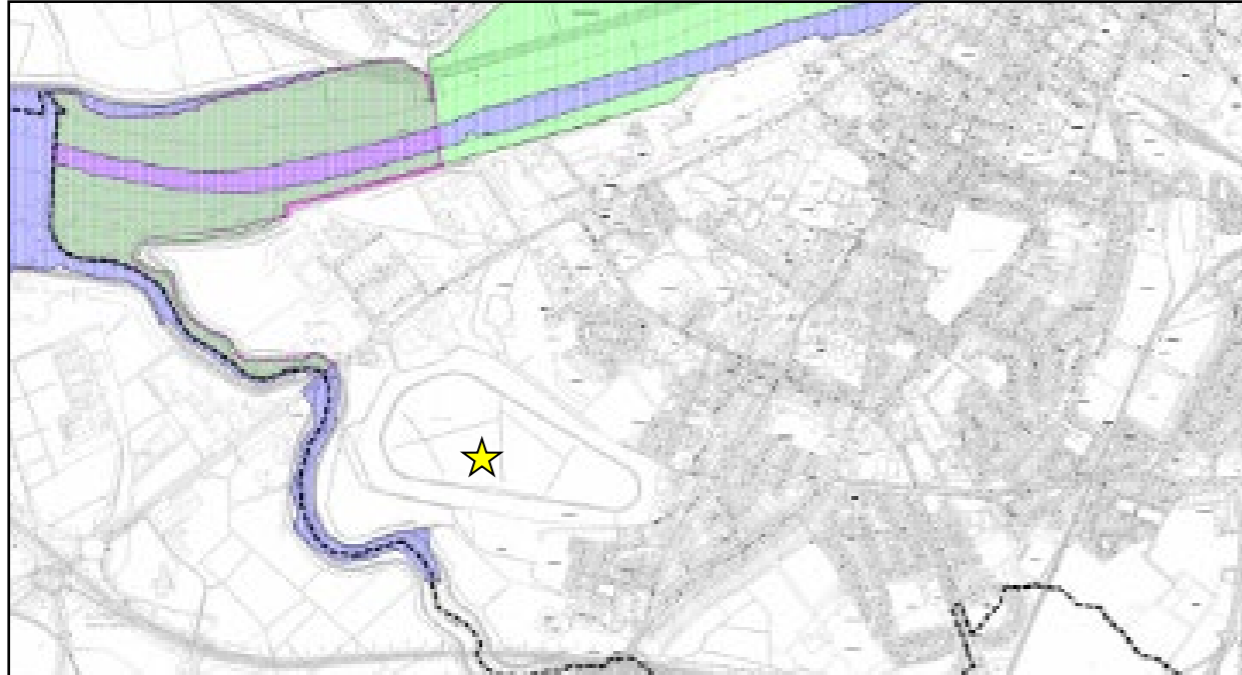


Figure 3.8: Extract of Map No. 5 of the *Limerick City Council Development Plan 2010-2016, Designated Sites Map*. Site is indicated with a yellow star. The green area denotes National Heritage Area (NHA), the pink denotes Special Protection Area (SPA) and the blue denotes Special Area of Conservation (SAC). Cropped and annotated by TPA, 2020.

4.0 FLOOD RISK

4.1 Introduction

RPS were commissioned to carry out a Flood Risk Assessment (FRA) in support of a masterplan for Greenpark, Limerick which will be a mix of office developments, residential units and a neighbourhood centre. Due to the technical nature of this Chapter, the Flood Risk Assessment (FRA) has been appended to this Masterplan Document (see Appendix A). Below we provide an overview of the assessment and a summary of the conclusions.

The purpose of this assessment is to ensure that the development takes cognisance of the existing flood risk and does not result in increased flood risk elsewhere. This report was prepared in accordance with the requirements of 'The Planning System and Flood Risk Management' Guidelines (DEHLG 2009).

4.2 Summary of Findings

The River Shannon flows at a distance to the north of the site and a small tributary, the Ballynaclogh River, flows to the west of the site. Both of these rivers can be considered to be tidal at this location. There are flood embankments along both the River Shannon and the Ballynaclogh River.

As part of the Shannon Catchment Flood Risk Assessment and Management (CFRAM) Study, Limerick was identified as an Area for Further Assessment (AFA). The CFRAM mapping and the levels derived from this study provide the best available information to assess the flood risk to proposed development site. These maps indicate that the 0.5% AEP flood event does not reach the application site. This is because of the protection afforded by the existing flood defences constructed under the 1945 Arterial Drainage Act. Under the requirements of 'The Planning System and Flood Risk Management Guidelines' the effects of any existing defences must be ignored and therefore the vast majority of the masterplan area is considered to be Flood Zone A, a small section is Flood Zone B and parts are Flood Zone C.

Applying the sequential approach set out in 'The Planning System and Flood Risk Management Guidelines' requires a Justification Test to be carried for development of residential and office use within flood zone A and B.

In accordance with Clause 5.16 of the guidelines a precautionary approach to development behind existing defences is to raise the finished levels to at least the 1% or 0.5% coastal flood level. This approach has been adopted for both the office and residential areas of the masterplan area.

Modelling of the impact of raising existing development was then undertaken considering both the 0.5% AEP and 0.5% AEP Climate Change (mid-range future scenario) flood level. There was no identified increase in risk to existing development as a result of this analysis. This is described in detail in Section 5.3 of the full report.

As a further robustness check full consideration of a flood defence breach during a 0.5% AEP flood event has been assessed. As a result of this analysis the proposed development has been elevated to provide protection against a catastrophic event of this nature. Breach analysis has confirmed that there no increase in flood risk to existing developments. This is described in detail in Section 5.4 and 5.5 of this report.

4.3 Key Aspects of the Flood Mitigation Measures

The following are the key aspects of the mitigation measures proposed within the Flood Risk Assessment and demonstrate a robust and sustainable approach to developing the Greenpark lands.

1. There is no reliance on the existing flood defences to provide any level of protection to the masterplan area.
2. The proposed masterplan is sustainable and will place no burden on Limerick City and County Council to provide additional flood defence infrastructure in the future.
3. The entire masterplan area will remain free from flooding during a 0.5% AEP Mid-Range Future Scenario event where overtopping of the existing defences occurs.
4. All buildings and key internal roads will be protected during a 0.5% AEP Mid-range Future Scenario event even when a breach of the existing defences has also occurred.
5. It has been robustly demonstrated that there is no increase in flood risk, even during a breach event, to surrounding developments.
6. A clear access and egress route for emergency vehicles can be provided to the office and residential campus and neighbourhood centre even during a breach event.
7. All storm drainage will be attenuated to existing run off rates and therefore will not cause capacity issues on the existing network or raise the increase of flooding elsewhere.

5.0 WATER AND HYDROLOGY

5.1 Introduction

This Chapter assesses the potential impact of the development of the proposed Greenpark Masterplan, on the receiving water quality environment and Water Framework Directive (WFD) compliance. Existing water quality in the vicinity of the project is established based on available water quality information and WFD monitoring programmes. The likely significant effects on water quality of the implementation of the Masterplan are assessed and measures to reduce, avoid and prevent these likely significant effects are proposed, where necessary.

The Greenpark Masterplan illustrates a mixed-use development vision for the lands consisting of an office campus (39,500 sq m); 834 no. residential units (including houses, duplexes and apartments); neighbourhood centre; nursing home (120 no. beds); crèche and open space provision with related car parking, ancillary services and roads infrastructure. It is envisaged that the initial phase of development will comprise a Strategic Housing Development (SHD) with 289 no. residential units, crèche and related infrastructure, with a separate planning application submitted under the conventional (Section 34) planning process for the nursing home. Both planning applications will include cumulative assessments as necessary and will be supported by the overarching Masterplan.

The assessment is based on the Masterplan description outlined above and has been prepared at a strategic level to identify potential water quality issues that may arise from the development of the Masterplan and presents possible mitigation measures that can be implemented to address the potential impacts.

The focus of this report is, therefore, not detailed environmental impact assessment but rather to consider at this Masterplanning stage possible constraints to the development that can be addressed in greater detail during the planning application stage.

5.1.1 Receiving Water Environment

A desk-based assessment of surface water quality in the vicinity of the Masterplan area was conducted. The sources of the water quality information include:

- Water Framework Directive water body status information arising from the Water Framework Directive monitoring programme. *Water Quality in Ireland Report 2010-2015* (2017) supported by water quality information available on the EPAs online Water Framework Directive Application (www.catchments.ie);
- Protected areas datasets including:
 - information on Nutrient Sensitive Areas as outlined in the EPA's most recent *Urban Waste Water Treatment Report* (2017); and
 - the existing Register of Protected Areas (under Article 6 of the Water Framework Directive) for water dependent habitats and species in the SAC and SPA networks held by the EPA.
- *Water Quality in Ireland – An Indicators Report* (2018);

For the purposes of monitoring and assessing the quality of surface waters, all rivers, lakes, coastal inter-basins, estuaries, and coastal waters (within 1 nautical mile of the shoreline) have been divided into management units called “water bodies”. Under the Water Framework Directive (WFD), the condition of each water body must be reported to the European Commission in the form of ecological status and chemical status. Ground water bodies are similarly delineated with status identified.

Surface water bodies are grouped into sub-catchments for the purposes of water management, of which there are 583 nationally, which are further grouped into catchment management units of which there are 46 based on the hydrometric areas used by public authorities. As illustrated in Figure 5.1, the development is located within Ballynaclogh_SC_010 sub catchment and the Shannon Estuary South sub-catchment. The Limerick Dock (IE_SH_060_0900) transitional water body runs parallel to the proposed development and incorporates the tidal reaches of the Ballynaclogh River. The Ballynaclogh_010 (IE_SH_24B040800) river water body is upstream of the Limerick Dock transitional water body. Figure 5.2 shows the lands in the context of the wider surface water body environment. These river and transitional water bodies ultimately discharge into the Upper Shannon Estuary (IE_SH_060_0800).

The project lies within the ‘Limerick City Southwest’ groundwater body (SH-G-141). This water body has achieved ‘good’ status during the 2013-2018 WFD monitoring cycle, although the 2010-2015 monitoring programme recorded ‘poor’ status as a result of impact of groundwater on surface water ecological status, which was attributed to nutrient pressures from agriculture (EPA, www.catchments.ie). All the waterbodies grouped into the Ballynaclogh_SC_010 sub-catchment (24_10) are within the Shannon Estuary South Catchment (Hydrometric Area 24) in the Irish River Basin District.

The soils, geology and hydrogeology section discusses the potential impact relating to groundwater which concludes that the overall hydrogeology impact from construction and operation of the development is considered to be Neutral. Based on monitoring information and data from 2013 to 2018, the current WFD status classification of river water bodies potentially affected by the Masterplan is illustrated in Figure 5.1. The WFD status classification between 2007 and 2018 is shown in Table 5.1 for each of these water bodies. In summary, the Limerick Dock was classified as “good”, while the Ballynaclogh_010 has not been assigned a status, whilst the downstream Upper Shannon Estuary has most recently been reported as “poor” status.

A further breakdown of the ecological and chemical elements for the 2013-2018 WFD cycles is shown below. The Limerick Dock water body is currently classified as “good” Ecological status improving from “moderate” status in the 2010-2015 monitoring cycle. The reason for this improvement is due to the fish status, which has improved from ‘moderate’ to ‘good’ biological quality. The Ballynaclogh_010 has yet been unassigned a status. The Upper Shannon Estuary has gradually declined from “good” status in the 2007-2009 monitoring cycle to “moderate” in the 2010-2012 monitoring programme and, more recently, has deteriorated to “poor” due to unacceptable biological conditions, which are impacted by nutrient pressures in the upstream catchment.

This assessment of on the potential impacts on water quality has been undertaken having regard to the necessity to comply with the WFD and in doing so ensuring that the project does not prevent the achievement of the environmental objectives for these water bodies in subsequent RBMP cycles. The water quality assessment, therefore, demonstrate that the Masterplan project will not cause deterioration in the status of these affected water bodies or prevent the improvement in status, where necessary, under the environmental objectives of the WFD.



Table 5.1: WFD Status (2007-2018)			
WFD Status 2007-2018	Limerick Dock	Ballynaclogh_010	Upper Shannon Estuary
	SH_060_0900	SH_24B040800	SH_060_0800
Overall WFD Water Quality Status (2007-2009)	Good	Unassigned	Good
Overall WFD Water Quality Status (2010-2012 - Interim)	Moderate	Unassigned	Moderate
Overall WFD Water Quality Status (2010-2015)	Moderate	Unassigned	Poor
Overall WFD Water Quality Status (2013-2018)	Good	Unassigned	Poor

Table 5.1: WFD Status Breakdown (2013-2018)							
WFD Status 2013-2018		Limerick Dock		Ballynaclogh_010		Upper Shannon Estuary	
		SH_060_0900		SH_24B040800		SH_060_0800	
Ecological Status	Biological Status	Phytoplankton Status	High	Not Available	High		
		Angiosperm Status	Not Available	Not Available	Poor		
		Invertebrate Status	Not Available	Not Available	Good		
		Fish Status	Good	Not Available	Good		
	Supporting Chemistry Conditions	Oxygenation Conditions	High	Not Available	High		
		Nutrients Condition	High	Not Available	Good		
		Phosphorus conditions	High	Not Available	Not Available		
		Relevant Pollutants	Pass	Not Available	Pass		
	Hydromorphological Quality Element	Hydrology, Morphology, Continuity	Not Available	Not Available	Good		
	Ecological Status (2013 – 2018)		Good	Not Available	Poor		
Chemical Status	Priority substances and other EU-level dangerous substances	Not Available	Not Available	Not Available			
	Chemical Status (2013 – 2018)		Good	Not Available	Good		
Overall WFD Quality Status 2010 - 2015		Good	Not Available	Poor			

5.1.2 Protected Areas

A significant proportion of the area of the Shannon Estuary South catchment is protected under existing EU legislation requiring special protection, due to the sensitivity to pollution or particular environmental importance. All of the areas requiring special protection in the Irish River Basin District have been identified by EPA, mapped and listed in a national register of protected areas (required under Article 6 of the WFD Directive).

The register of protected areas includes:

- areas designated for the abstraction of water for human consumption (Drinking Water Protected Areas);
- areas designated for the protection of economically significant aquatic species, i.e. Freshwater Fish and Shellfish;
- bodies of water designated as recreational waters, including areas designated as bathing waters;
- nutrient-sensitive areas, including areas identified as Nitrate Vulnerable Zones under the Nitrates Directive or areas designated as sensitive under Urban Waste Water Treatment Directive; as well as
- areas designated for the protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection including relevant Natura 2000 sites (Special Protection Areas (SPAs); and candidate Special Areas of Conservation (cSACs).

These protected areas have their own monitoring and assessment requirements to determine their condition. They are often assessed for additional pollutants or requirements relevant to their designation. Protected areas within the project area include Nutrient Sensitive Waters.

a) Nutrient Sensitive Waters

The *Urban Waste Water Treatment Regulations 2001*, as amended (which transpose the *Urban Wastewater Treatment Directive (91/271/EEC)* into Irish law and update the *Environmental Protection Agency Act, 1992 (Urban Waste Water Treatment) Regulations 1994, as amended*) list nutrient sensitive waters in the Third Schedule. There are no nutrient sensitive areas in the catchment.

b) Natura 2000 Protected Areas

Natura 2000 is a European network of important ecological sites. The EU Habitats Directive (92/43/EEC) places an obligation on Member States of the EU to establish the Natura 2000 network. The network is made up of Special Protection Areas (SPAs), established under the EU Birds Directive (79/409/EEC), and cSACs, established under the Habitats Directive itself.

As illustrated in Figure 5.2, the project activities within the Greenpark Masterplan area will not be within any designated Natura 2000 site. In the absence of adequate mitigation, there is some potential for water dependent protected areas downstream of the proposed development to be indirectly affected, e.g., in the event of a pollution event.

One of the main purposes of the water quality assessment is to ascertain whether the development will cause significant effects on the ecological status of the water bodies affected, having regard to the environmental objectives for the water bodies, including conservation objectives for qualifying features of the downstream Natura 2000 network. It should also be noted that potential effects on Natura 2000 or “European” sites will be considered extensively in the appropriate assessment process which will be undertaken during the development consenting stage of the development.

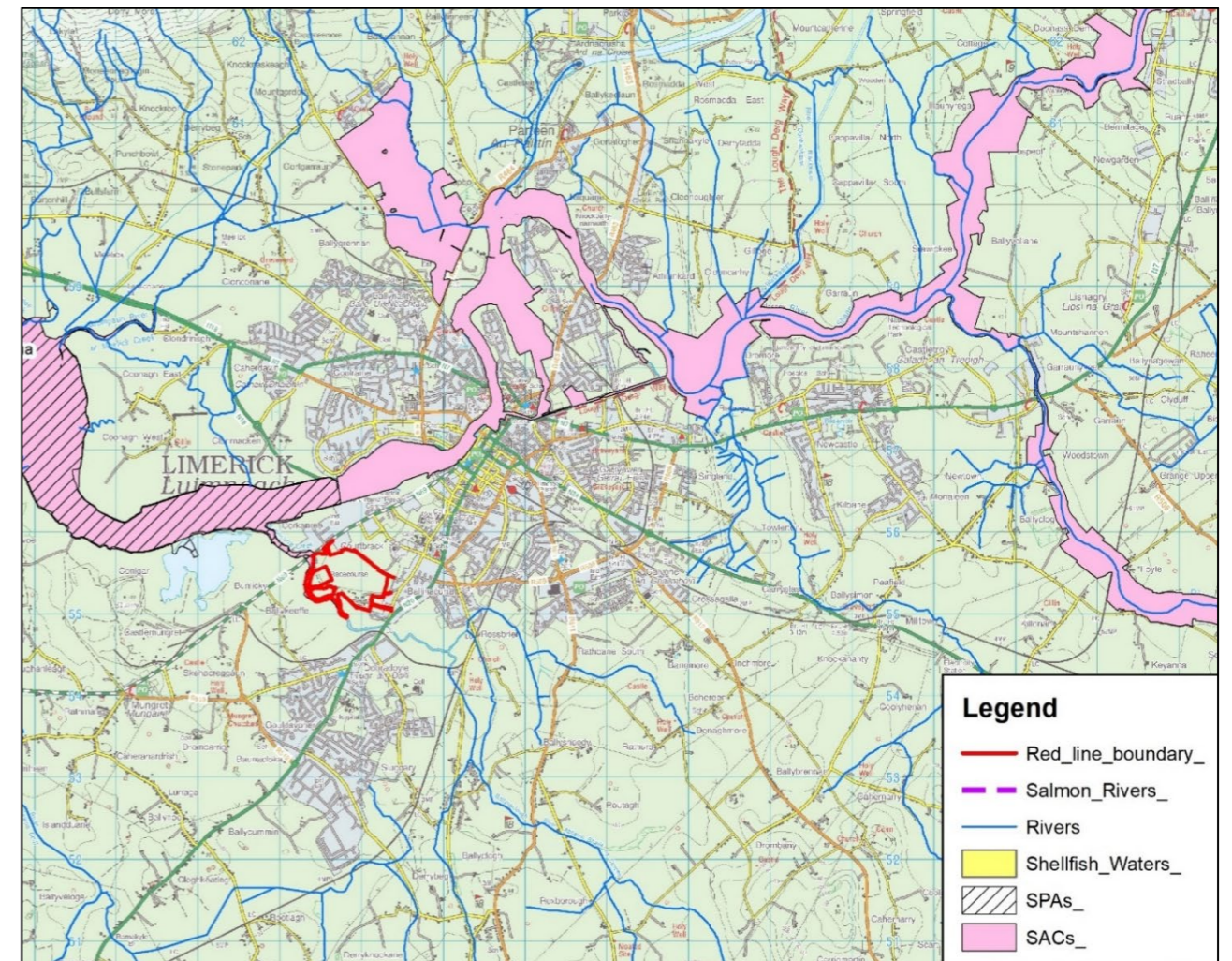


Figure 5.1: Natura 2000 Designated Sites

c) Bathing Waters

The Bathing Water Directive (2006/7/EC) came into force in March 2006, and was transposed into Irish law by the *Bathing Water Quality Regulations, 2008*, as amended. The previous 1976 Directive was repealed with effect from 31 December 2014. Since 2014, the annual water quality classification (rating) of a beach or lake has been based on water quality results covering a four-year period rather than a single previous season’s data. Water quality at beaches and lakes is classified as Excellent; Good, Sufficient or Poor (Table 5.7). This approach is common across all EU Member States and there is a requirement to ensure that bathing waters are of ‘Sufficient’ standard or better. Any ‘Poor’ bathing water requires a programme of adequate management measures to be implemented. A minimum of 16 samples are required for formal annual assessment.

Parameter	Excellent	Good	Sufficient
E. coli (Freshwater) cfu/100 ml	500*	1000*	900**
E. coli (Coastal) cfu/100 ml	250*	500*	500**
Intestinal enterococci (freshwater) cfu/100 ml	200*	400*	330**
Intestinal enterococci (Coastal) cfu/100 ml	100*	200*	185**

*based on 95-percentile value **based on 90-percentile value

There are no designated bathing waters in the catchment but the bathing areas further downstream are located at Cappagh Pier Kilrush and Ballybunnion North and South. Bathing waters are significantly downstream, with the closest, Kilrush, over 50km downstream. Most recently, Cappagh Pier Kilrush has been classified as Excellent; Ballybunnion North as Good and Ballybunnion South as Excellent. Ballybunnion North has deteriorated from Excellent to Good in the 2019 monitoring period. The remaining sites showed no change over this interval.

d) EPA Water Quality in 2017: An indicators Report

In 2018 the EPA published the Water Quality in 2017, An Indicators Report. The intention of the report is to keep decision makers and the public informed by providing timely, scientifically sound information on water quality using a series of water quality indicators. Of the sixteen indicators three relate to transitional and coastal water bodies located in close proximity to the project;

- Indicator 9 – Trophic Status of Estuaries and Coastal Waters: The Indicators reported determined Limerick Dock and the Upper Shannon Estuary to be unpolluted during the 2015-2017 Trophic Status Assessment;
- Indicator 10 – Nitrogen in Estuaries and Coastal Waters: The Indicators Report showed that both Limerick Dock and the Upper Shannon Estuary exceeded the levels of dissolved inorganic nitrogen less than 50% of the time during the 2015-2017 monitoring. The trends in DIN concentrations indicated that levels were stable and neither increasing nor decreasing during the monitoring. During the 2013-2018 monitoring period, upward trends have been recorded for both water bodies, however, neither are environmentally significant. The Masterplan development will produce foul water, a potential source of additional N loading to the estuary; however, the foul water will be treated in the Limerick WWTP, which has adequate capacity to ensure that the existing emission limit values from the WWTP will not be exceeded.
- Indicator 11 – Phosphorus in Estuaries and Coastal Waters: The Indicators Report shows the Upper Shannon Estuary and Limerick Dock to both be in exceedance of phosphorus levels less than 50% of the time. The 2013-2018 data shows upwards trends associated with both water bodies, although neither are environmentally significant. Phosphate is essential for plant growth but excessive levels can be detrimental to river ecological health and lead to eutrophication. The primary sources of phosphate in freshwater systems are sewage/industrial discharges and both diffuse or point sources from agricultural land. The Masterplan development will produce foul water, a potential source of additional P loading to the estuary; however, the foul water will be

treated in the Limerick WWTP, which has adequate capacity to ensure that the existing emission limit values from the WWTP will not be exceeded.

In this water quality assessment, consideration has been given to potential effects of the development of the Masterplan on these environmental indicators.

e) Summary of Existing Water Quality

A review of available national monitoring information for the water bodies in the immediate vicinity of the application boundary has concluded:

- The overall WFD Surface Water Quality status between 2013-2018 is:
 - Limerick Dock – Good Status
 - Ballynaclogh_010 – Unassigned Status
 - Upper Shannon Estuary – Poor Status
 - Limerick City Southwest groundwater body – Good Status
- Downstream of the Masterplan area, there are a number of protected areas under Article 6 of the WFD Directive, i.e., Natura 2000 sites and bathing water although the nearest bathing water is over 50 km from the site;
- Nutrient levels in the receiving water bodies are the main driver for the unsatisfactory water quality;
- The ground conditions at the site mean that the main pathway for contamination is via surface water pathways which are particularly important for phosphate export, which is the key limiting nutrient in transitional water bodies.

5.1.3 Likelihood of Impacts

The likelihood of environmental impacts arising due to the development of the Masterplan is assessed in relation to the construction and operational phases. The elements of construction and operation and the potential impacts on water quality have been identified for assessment.

The significance of any environmental effect is rated based on the magnitude of the impact and the importance of the attribute. Based on this criteria the receiving environment is considered to be of high importance due to the fact that the water bodies are within the Shannon Estuary South catchment and provide a hydrological link to the important downstream protected areas, particularly the Natura 2000 sites.

In summary and for the purposes of this impact assessment, the following Masterplan elements have been considered:

- Construction of an office campus (39,500 sq m); 834 no. residential units (including houses, duplexes and apartments); neighbourhood centre; nursing home (120 no. beds); crèche and open space provision with related car parking, ancillary services and roads infrastructure;
- Surface Water Drainage for the development;

- Foul Water Drainage for the development.

a) *Potential Construction Phase Impacts*

Based on the nature of the components of works proposed for the development of the Masterplan, temporary impacts on water quality have the potential to occur during the construction phase of the works. The following have been considered in this assessment:

- Increased suspended sediment levels due to the accidental release of sediment to the water column during:
 - Construction of buildings & structures;
 - Cut and fill operations.
- Suspended sediment, including all soils, sands and rubble is the single main pollutant to the aquatic environment generated at construction sites and largely arises from the erosion of exposed soils and sediments by surface water runoff. Both temporary and permanent impacts on surface waters may occur during construction. Pollution from mobilised suspended solids (silt) is the prime concern. Suspended sediment due to run off from stripped construction areas, stockpiled earth and the dewatering of excavations can have a severe negative impact on water quality. Once suspended sediment load enters a river it can result in long-term changes that cause chronic harm. Sediment can cause river hydro morphological changes, which in turn change the dynamics of the river in the future and can negatively impact on the supporting hydro morphological conditions and ecological status resulting in an increased risk to the environmental objectives of a water body.
- Accidental release of highly alkaline contaminants from concrete and cement during the construction of hardstand areas, etc. The construction works associated with the development of the Masterplan will involve the use of cement and concrete for some of the hard standing areas and construction of buildings. During the construction phases, there is the potential for impact on the water quality and a toxic effect on the biological elements resulting in a possible further deterioration in the ecological status or compromise the improvement in ecological status through the implementation of the programme of measures included in the River Basin Management Plan; and
- General water quality impacts associated with works machinery, infrastructure and on-land operations including the temporary storage of construction materials, oils, fuels and chemicals.

b) *Potential Operational Phase Impacts*

The operational phase impacts associated with the project represent general water quality issues associated with surface and foul water drainage. General water quality impacts associated with runoff from parking areas and other hard standing areas that will be directed towards storm water network via gullies and channels. This surface water drainage network will direct un-attenuated surface water to the existing lagoon for attenuation and some level of treatment prior to discharge via the existing outfall to the tidal reaches of the Ballynaclogh River.

It is, therefore, imperative to ensure that mitigation proposed during the operational phase of the developments in relation to drainage and flood relief are adhered to. There will be limited direct impact to Limerick Dock water body itself that would result in significant changes to the hydro morphological

regime of the river and provided the attenuation lagoon has adequate capacity, there will be a beneficial impact associated with the operational phase through the attenuation of contaminants and, therefore, water quality.

- Storm water Run-off Contamination

The operational phase of the Masterplan will require the management of surface water run-off from hard standing areas associated with the office campus, residential units, neighbourhood centre; nursing home and crèche. During the operational phase, there is potential for fuel or oil spillages and contaminants from vehicle engines. Run-off from these hardstanding areas, e.g. parking areas, roadways, may be impacted with residual hydrocarbon contaminants from fuel emission and tyres, sediment and trace contaminants like metals and organics and, therefore, represent a potential source of contamination that could have a pathway to surface waters through the storm water drainage system. The nature of these contaminants could have a toxic effect on the biology of the receiving waters affecting the ecological status and chemical status of the water body and thereby potentially impacting on the ability of the water body to achieve its environmental objectives and downstream conservation objectives for the Natura 2000 sites.

- Foul Sewerage

Inadequate or inappropriate urban wastewater infrastructure can result in significant pressures to surface water bodies particularly where misconnections (i.e. piping of sewerage directly to a storm water network or surface water body), can result in significant impacts to the biology and chemistry of the aquatic environment. It is also important to ensure the existing sewer network within an agglomeration has capacity to accept the additional hydraulic and pollutant loading from the Masterplan development and that adequate treatment is provided at the wastewater treatment system so as not to impact the receiving environment and downstream sensitive areas, particularly given that existing nutrient pressures are the key driver for the receiving water bodies failing to achieve their environmental objectives, i.e. the classification of 'less than good' ecological status.

c) *Mitigation Measures*

In the absence of mitigation, the construction and operation of some elements of the project has the potential to impact on the aquatic environment.

With these considerations in mind, detailed mitigation will be incorporated into the engineering design of the project as necessary at the planning application stage to minimise potential impact on the water environment. The risk to water quality posed by this project during construction and operation will be dependent on the quality of drainage and treatment of site run-off before discharge to the aquatic environment. Therefore, procedures will be put in place for the control and minimisation of surface water and suspended solids movement, contaminant run-off and appropriate design of foul and storm water drainage.

d) *Potential Mitigation Incorporated into the Design*

Drainage

- Wastewater

Wastewater generated on-site particularly during the operational phase of the development will be piped and discharged to the existing Irish Water foul sewer. Agreement to discharge to the existing foul network and downstream WWTP will be secured with Irish Water and will ensure the wastewater discharge authorisation for the existing agglomeration will not be adversely affected.

- Surface Water

The development will incorporate a variety of Sustainable Drainage Systems (SuDS) techniques to counteract the potential increased runoff as a result of increased hardstanding. SuDS supplemented by bypass separators on the piped storm water network, will include green roofed apartments, permeable paving of driveways and car parks, tree lined areas, as well as, grassed and open space landscape portions of the site.

The development site has an existing lagoon, which is capable of servicing an area of 39 hectares. After attenuation in the lagoon, it is proposed to discharge the storm water runoff from the proposed development via the existing storm water outlet. This system will cater for the strategic housing development scheme and a significant portion of the other developments within the Masterplan. Provided the best-practice techniques illustrated in CIRIA's guidance document (C768 – Guidance on the Construction of SuDS) are followed, no further mitigation is required.

e) **Potential Construction Phase Mitigation Measures**

Construction Phase Best Practice Measures

Mitigation measures will be implemented as necessary by the contractors who will construct the Masterplan developments in accordance with the requirements listed within a Construction Management Plan and Construction Environmental Management Plan, which will be submitted as part of the planning applications for the future developments. Furthermore, once appointed, the contractors will submit a detailed construction environmental management plan based on the requirements of the submitted planning documents for approval by the Planning Authority in advance of works commencement.

The mitigation measures implemented by the contractor will refer to the construction management procedures for best practice regarding the following recognised international guidelines:

- Good practice guidelines on the control of water pollution from construction sites developed by the Construction Industry Research and Information Association (CIRIA, 2001);
- Good practice guidelines from CIRIA's guidance document (C768 – Guidance on the Construction of SuDS) (2017).

f) **Potential Operational Phase Mitigation Measures**

Storm Water Run-off

During the operational phase in the event of flooding, there is potential for storm water run-off to be impacted by pollutants arising within the hard standing areas, e.g. car parking areas and roadways. This runoff has the potential to provide pathways for a wide range of contaminants arising from general operations of the development to the aquatic environment. The main potential pollutants from surface water drainage or direct run-off are sediment, hydrocarbons, and trace contaminants including metals and organics.

The existing lagoon and pervious pavements have proposed dual purpose and whilst they are flow attenuation features they also mitigate against potential water quality issues associated with storm water run-off.

Gravity pipe networks will collect runoff from hardstanding areas and roof areas (although grass roofs will be used where feasible in certain buildings e.g., apartment blocks), while parking areas will be constructed with pervious asphalt. All surface water drainage from hard standing areas will ultimately drain to the lagoon via suitable sized class 1 bypass interceptors.

Foul Sewerage

The foul sewerage from the development will be collected in the existing Irish Water foul water sewer. Foul Water will, therefore, be collected into the existing system and will be taken forward for appropriate treatment prior to discharge to the receiving environment.

Both the surface water and foul system are to be entirely separate systems.

5.1.4 *Interactions*

The water environment and impact on water quality has the potential to impact on water dependent habitats and species in the water bodies affected and therefore there is a strong interaction with biodiversity. The protection of the water environment will help to ensure that biodiversity is not significantly impacted by the implementation of the Masterplan.

Geology and soils also has a strong interaction with the water quality with the interaction of surface and sub surface water important to the generation of run-off and the mitigation of same. Given the nature of the soils and location of the development surface and near surface pathways will be dominant and this will be considered during the detailed mitigation strategy for the development of the Masterplan.

5.1.5 *Cumulative Effects*

The Greenpark Masterplan illustrates a mixed-use development vision for the lands consisting of an office campus (39,500 sq m); 834 no. residential units (including houses, duplexes and apartments); neighbourhood centre; nursing home (120 no. beds); crèche and open space provision with related car parking, ancillary services and roads infrastructure. It is envisaged that the initial phase of development will comprise a Strategic Housing Development (SHD) with 289 no. residential units, crèche and related infrastructure, with a separate planning application submitted under the conventional (Section 34) planning process for the nursing home. Both planning applications will include cumulative assessments as necessary and will be supported by the overarching Masterplan.

The potential mitigation provided in this Chapter, as well as mitigation incorporated into the design of the each phase of the Masterplan at the planning application stage, will ensure that any negative impact to water quality is not significant. Therefore, this development will not contribute, directly or cumulatively to a significant deterioration in water quality.

5.1.6 *Conclusions*

Baseline water quality within the receiving environment was established through review of national monitoring data used to establish water quality status in the context of the EU Water Framework Directive (WFD) and supporting environmental standards.

Where the appropriate mitigation measures, to be determined during the individual planning applications for the Masterplan implementation, are fully implemented during the construction and operational phases of the developments, the impact on the water quality in the area will not be significant.

It can, therefore, be concluded that the Masterplan can be implemented in a manner that ensures compliance with the requirements and environmental objectives of the EU Water Framework Directive and the other relevant water quality objectives for the water bodies that have the potential to be affected.

The Masterplan has the potential to directly impact upon the Limerick Dock water body, given the location of the future works. The potential to indirectly impact upon the downstream Upper Shannon Estuary water body and sensitive areas further downstream has also been considered.

5.2 SOILS, GEOLOGY AND HYDROGEOLOGY

5.2.1 Introduction

The Greenpark Masterplan illustrates a mixed-use development vision for the lands consisting of an office campus (39,500 sq m); 834 no. residential units (including houses, duplexes and apartments); neighbourhood centre; nursing home (120 no. beds); crèche and open space provision with related car parking, ancillary services and roads infrastructure. It is envisaged that the initial phase of development will comprise a Strategic Housing Development (SHD) with 289 no. residential units, crèche and related infrastructure, with a separate planning application submitted under the conventional (Section 34) planning process for the nursing home. Both planning applications will include cumulative assessments as necessary and will be supported by the overarching Masterplan.

5.2.2 Baseline Environment

a) Solid Geology

The bedrock geology anticipated in the vicinity of the site is shown on Figure 5.3. The entire site area is underlain by Limestone and Calcareous Shale.



Figure 4.3: Solid Geology (taken from GSI's Spatial Resources portal)

b) Drift Geology

Drift is a general term applied to all mineral material (clay, sand, silt, boulders) transported by a glacier and deposited directly by or from the ice, or by running water emanating from the glacier. It generally applies to Pleistocene glacial deposits.

The drift geology of the area is expected to principally reflect the depositional process of the last glaciation when an extensive ice sheet that extended into the Irish Sea covered the region. Typically, during the ice age, advance boulder clays were deposited sub-glacially as lodgement till over the eroded rock head surface, whilst moraine deposits were laid down at the glacier margins. Subsequently, with the progressive retreat of the ice sheet from the region, fluvio-glacial deposits (sand, gravel and silt) were laid down by melt waters discharging from the front of the glacier. Recent deposition prior to reclamation of the site principally reflects marine erosional and depositional processes, which have modified the glacial deposits.

The GSI mapviewer indicates that the site is underlain by made ground deposits with estuarine silts and clays in the vicinity of the Ballynacloagh River.



Figure 4.4: Drift Geology (taken from GSI's Spatial Resources portal)

c) Hydrogeology

The hydrogeology of the area has been described by the Geological Survey of Ireland as complex and very variable. The Limestone bedrock is generally considered to be indurated and hence dominated by fissure permeability (e.g. joints and faults). Such permeability is likely to be low except where coarse, clean Limestones where present, have been karstified, dolomitised or are highly fractured.

The Lower Carboniferous rocks that underlie the region have been classified by the Geological Survey of Ireland as “Locally Important Aquifer, bedrock which is moderately productive only in local zones” (Figure 5.4). These locally productive zones are due to the presence of more permeable strata that are encountered in different parts of the outcrop area, due to substantial faults, fractures or fissures. The limited groundwater movement within the rock tends to be restricted to the weathered horizons or to non-extensive fractured zones. These zones tend to have a limited hydraulic continuity, low storage capacity and low potential yield.

The Quaternary drift is considered the principal medium for groundwater movement in the area. The infiltration capacity of the clay deposits would be limited due to their low permeability and hence groundwater movement is likely to be confined to the fluvio-glacial sand and gravel deposits that overlie the clays. The potential importance of the Quaternary drift deposits as a groundwater resource is a function of their permeability, thickness and extent.

The low permeable fine grained glacial clays represent aquitards that limit infiltration and restrict recharge to bedrock aquifers when sufficiently thick. The overlying fluvio-glacial till deposits represent material with a significantly higher permeability. Consequently, these deposits have a high potential recharge and storage capacity.



Figure 4.5: Bedrock Aquifer (taken from GSI’s Spatial Resources Portal)

d) Groundwater Vulnerability

The large majority of the site falls within an area of low groundwater vulnerability, with a small portion of the north east classified as being moderately vulnerable.

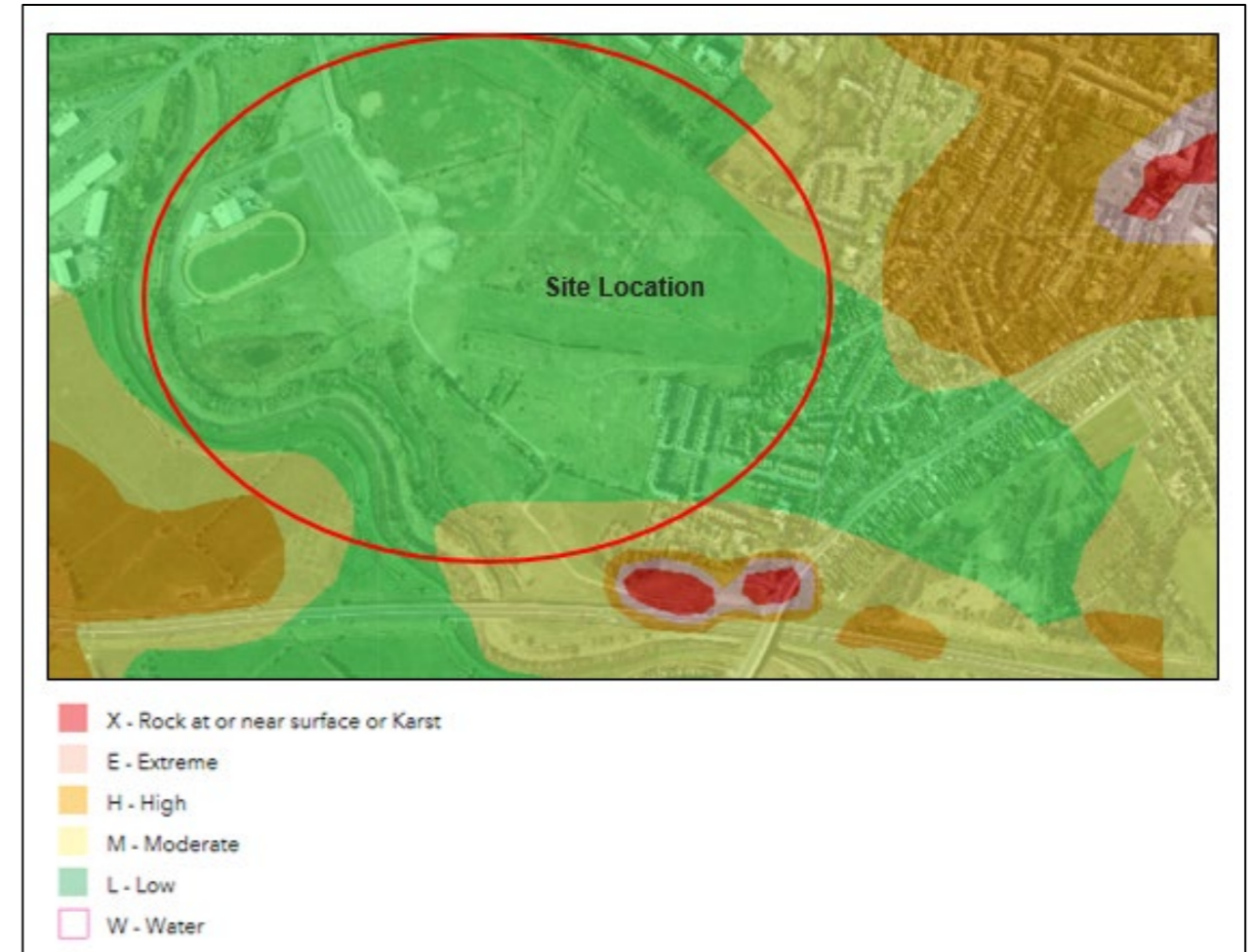


Figure 4.6: Groundwater Vulnerability Classification (taken from GSI’s Spatial Resources portal)

e) Geological Heritage Areas

There are no designated geological heritage areas within the vicinity of the site.

f) Groundwater Abstractions

The GSI map viewer identified one groundwater abstraction well located 0.24km east of the site.

g) Ground Investigation

Gavin & Doherty Geosolutions (GDG) excavated twenty-three (23) trial pits within the site in July 2020. This was carried out to gain a better understanding of the ground conditions at the site from an environmental and geotechnical perspective. Slit trenches were also carried out in the southern portion of the site to gain an understanding of foundations, proximal to where the former buildings associated with the racetrack were historically located. The TP locations at the site can be seen below in Figures 5.7 and 5.8. The trial pit logs provided by GDG will be contained within the final Appendices.

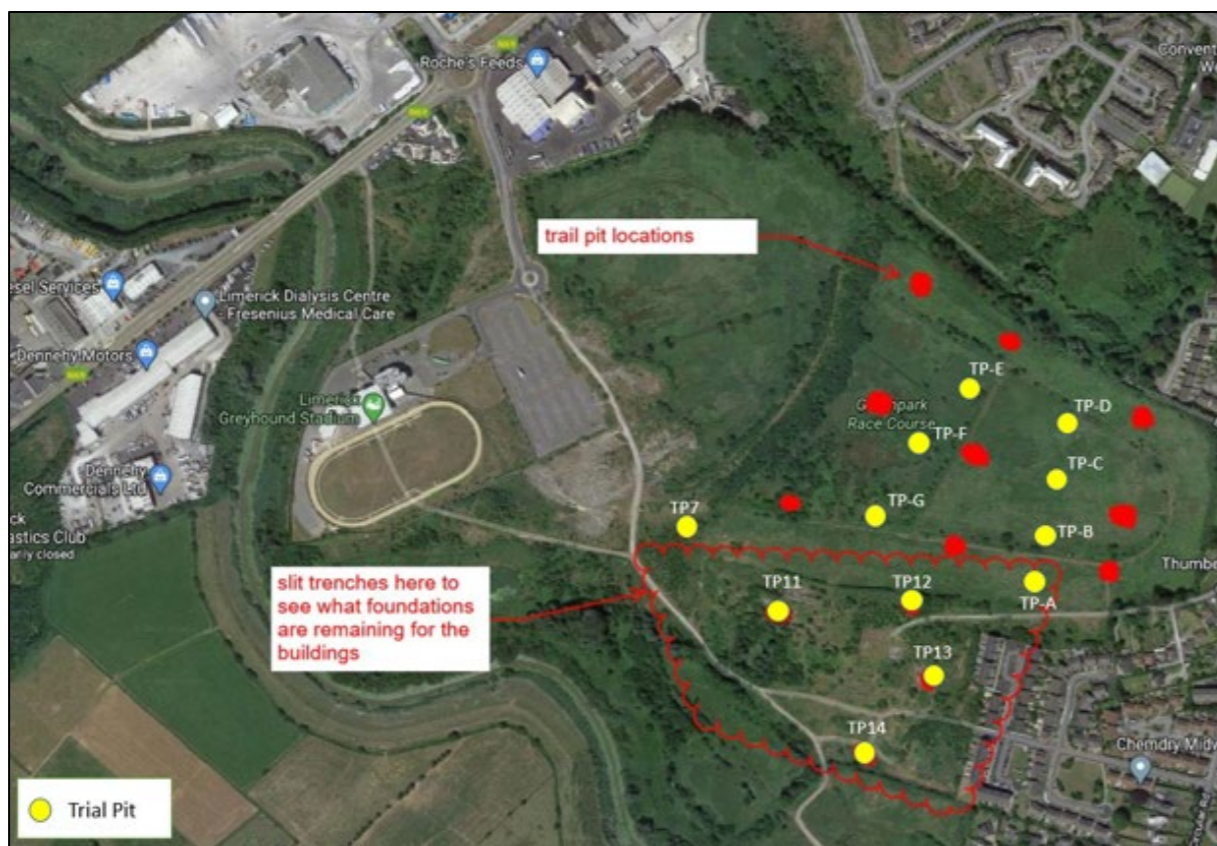


Figure 4.7: Location of trial pits and slit trenches.



Figure 4.8: Location of trial pits.

The ground conditions encountered during the excavations of the trial pits in Figure 5.7 varied, with both natural and made ground encountered. Trial pits excavated to the southern portion of the site were characterised more so by made ground, this was encountered in TP7, TP11, TP12, and TP14. Made ground was <1.00m in depth and contained a range of materials from boulders, cobbles, brickwork, plastics and cables. This was expected given this portion of the site has foundations of previous infrastructure such as grand stands and other facilities associated with the historic racetrack.

The ground conditions encountered during the excavations of the trial pits carried out in Figure 5.8 varied, with both natural and made ground encountered. Made ground was encountered in the majority of trial pits within TP102, 103, 104, 105, 106, 107 and 108. The make-up of this made ground was <1.00m in depth and contained a variety of material such as rubble fill, plastics, brickwork, pipework, timber and organics.

The logs indicate that groundwater was generally not encountered. Only one groundwater strike is noted in the log from BHD with 'significant groundwater ingress at 2.2m boundary, perched on lower layer'. The lower layer consists of sub angular boulders and cobbles, sand and gravel which appear to be water bearing.

5.2.3 Potential Construction Impacts

The development will involve cut and fill earthworks and importation of suitable fill material for part of the site to re-profile the site. The underlying aquifer is classified as being a locally important aquifer. No groundwater wells or springs are present within the site; however, a groundwater abstraction is located approximately 0.24km east of the site. The impact of the re-profiling activities on the underlying aquifer is considered to be minimal. Any fill material will be imported from authorised sources and will have minimal potential for leaching contaminants into the underlying groundwater. Given the distance to the offsite abstraction, the impact to this receptor is considered to be minimal.

5.2.4 Potential Operational Impacts

The proposed development will not contain any significant potentially contaminating activities. Groundwater will not be abstracted from the site. The operational impact on groundwater is expected to be minimal.

5.2.5 Mitigation Measures

No specific construction or operational mitigation measures are required with regard to hydrogeology. Mitigation measures required for surface water quality and ecology will also function to be protective of groundwater quality.

5.2.6 Recommendations

The GDG trial pit investigation identified the presence of made ground across the site. Made ground which is high in organics may be a potential source of ground gases such as Methane and Carbon Dioxide. These gases may migrate into buildings including residential properties and pose a risk to human health receptors. It is recommended that monitoring of ground gases is undertaken and a ground gas risk assessment is completed to quantify the risk from ground gas ingress to residential end users.

5.3 WATER AND DRAINAGE

5.3.1 Introduction

This Chapter outlines the proposed drainage and watermain strategy for the Greenpark Masterplan. The Masterplan consists of residential units, an office campus, neighbourhood centre, café/restaurant, a crèche and a nursing home.

Regional SUDS attenuation (Lagoon) and strategic surface water conveyance systems (pipework) were constructed within Greenpark lands and have sufficient capacity to attenuate flows from Greenpark and adjoining lands for the contributing areas noted in Table 5.1. Surface water attenuation will be required for the office campus development/commercial development.

Proposed Sustainable Urban Drainage Systems (SuDS) will decrease the impact of the development on the receiving environment by improving water runoff quality and reducing water runoff quantity. It is proposed that foul water from the proposed development shall discharge by gravity to the existing 225mm/300mm foul sewer within Greenpark prior to discharging to the Limerick Main Drainage Network.

It is proposed that the potable water requirements of the proposed development will connect to the existing 300mm diameter watermain within Greenpark.

A pre-connection application enquiry (Customer Reference No. CDS20006611) was issued to Irish Water in October 2020 to review whether there is adequate capacity in the Irish Water network for the proposed development. The Irish Water design team are currently reviewing this pre-connection application enquiry and a Confirmation of Feasibility letter is awaited.

5.3.2 Surface Water Drainage

a) Existing Surface Water Drainage Network

As part of the previous re-development proposals of the former racecourse lands at Greenpark in 2006, Limerick Race Company plc was required to provide stormwater drainage infrastructure with sufficient capacity to serve both Greenpark lands and other adjoining developments. This requirement was based on the recommendations of a White Young Green (WYG) report 'Ballinacurra-Courtbrack Drainage Study' prepared for Limerick Corporation (dated September 1999) and subsequent revision (dated December 2001).

Regional SUDS attenuation (Lagoon) and strategic conveyance systems (pipework) were constructed within the Greenpark lands.

Limerick Race Company entered into an agreement with Limerick City and County Council (LCCC) under Section 23 of the *Local Government (Planning & Development) Act 1963* to deliver the above infrastructure required.

Based on the WYG Drainage Study, the Lagoon was designed to take into account future developments. The total allowable contributing areas into the Lagoon from Greenpark and adjoining lands totals 39.19 ha. The extent of the contributing areas into the Lagoon is summarised in Table 5.3.

Contributing Area	Area (ha)
Greenpark Masterplan	14.561 ha
Mary Immaculate College	2.91 ha
Oil Storage Depot	2.38 ha
Fitzhaven	3.7 ha
Convent	2.42 ha
Alandale	9.81 ha
Other	3.404 ha
Total Impermeable Area	39.19 ha

The WYG Drainage Study (September 1999) recommended that the Lagoon required a design capacity of 16,700m³ for the above contributing areas. The Study further states that the Lagoon attenuates flows to Greenfield discharge rate and discharges to the Ballynaclogh River. This is achieved through the use of a penstock structure.

The design capacity for the Lagoon of 16,700m³ was based on a 50 year return period design criteria. Current guidelines require attenuation to be provided for a 30 year design return period with no flooding to occur for a 100 year return period with a 10% allowance for climate change. Based on a total contributing catchment area of 39.19ha, the Lagoon would require a design capacity of 21,000m³ for a 100 year Return Period with a 10% allowance for climate change.

The as built capacity of the existing lagoon is approximately 23,000m³ based on a topographical survey undertaken in November 2017. Therefore, the existing lagoon has sufficient capacity to attenuate flows from Greenpark and adjoining lands for the contributing areas noted in Table 5.3.

Based on existing record drawings, surveys and site visits, it was established that the following surface water drainage infrastructure is located within the Greenpark lands:

- 1,350mm/1,500mm diameter pipe flowing north-east to south west from the boundary of the Alandale Development to the existing lagoon (see Figure 5.9). This pipe was designed to receive surface water from Greenpark, Mary Immaculate College, Oil Storage Depot, Fitzhaven, Convent and Alandale lands.
- 525mm diameter pipe flowing north-west to south east from the Limerick Greyhound Stadium roundabout to the existing lagoon (see Figure 5.9). This pipe was designed to receive surface water from Greenpark lands.
- An existing lagoon which was designed to receive surface water from the lands noted in table 5.1 and attenuates flows to greenfield runoff rate (see (see Figure 5.9). The existing lagoon consists of:
 - Inlet structure to the lagoon;
 - Penstock structure - the penstock structure controls the flow of the water from the lagoon to the outfall structure in the Ballynaclogh River;

- Outfall structure - the outfall structure is constructed of reinforced concrete and contains a 1,050mm diameter Tideflex valve with thimble plate which allows discharge of water to the river at low tide but prevents backflow into the lagoon in times of high tide.

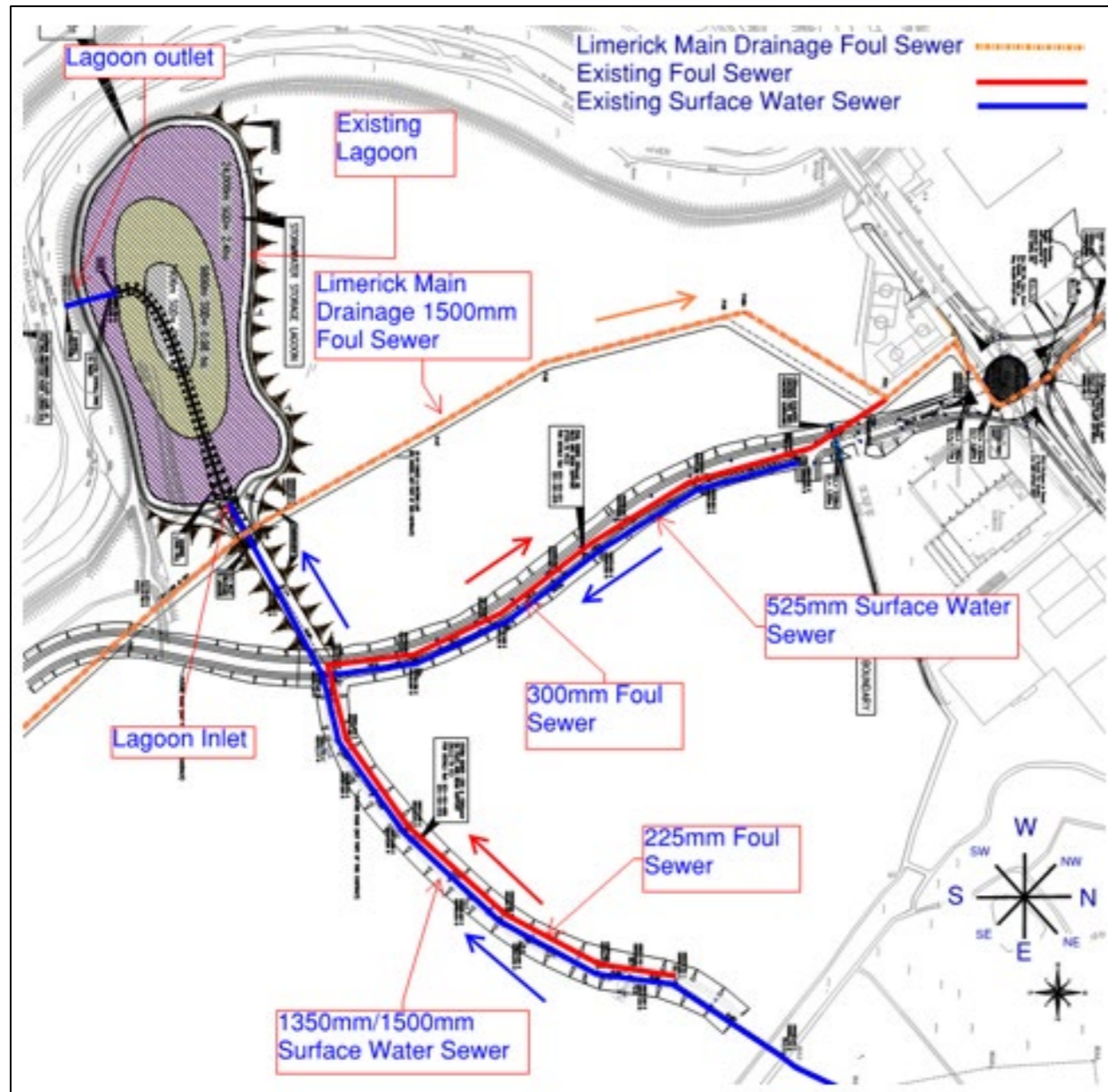


Figure 5.9: Existing Drainage Layout

b) Proposed Surface Water Drainage Network

It is proposed that surface water from the residential and nursing home development will flow by gravity to the existing lagoon via the existing 1,350mm/1,500mm diameter pipe.

It is proposed that surface water from the office campus development/commercial development will be attenuated to greenfield discharge rate and flow by gravity to the existing lagoon via the existing 1,350mm/1,500mm diameter pipe.

Attenuation is required from the office campus development/commercial development as the Greenpark Masterplan has a contributing area greater than the permissible 14.561 ha as noted in Table 5.3.

c) Sustainable Urban Drainage Systems (SuDS)

The Greenpark Masterplan has been assessed in relation to Sustainable Urban Drainage Systems (SuDS) and a variety of SuDS measures are proposed. All SuDS measures will require to be implemented in accordance with CIRIA SuDS Manual 2015 C753 (The SuDS Manual) and Limerick City & County Council water services department requirements.

The SuDS measures will decrease the impact of the development on the receiving environment by improving water runoff quality and reducing water runoff quantity. The SuDS measures will also provide an amenity to residents and a biodiversity element to the development. Regular maintenance of the SuDS proposals is required to ensure they are operating to their optimal level throughout their design life.

The following SuDS measures are proposed for the Residential Development and Nursing Home:

- Green roofs on apartment blocks and nursing home
- Tree pit systems
- Permeable paving on driveways and visitor parking
- Infiltration trenches
- Swales
- Class 1 bypass separator

The following SuDS measures are proposed for the office campus development/commercial Development:

- Green roofs
- Tree pit systems
- Permeable paving on car parks
- Infiltration trenches
- Swales
- Class 1 bypass separator
- Attenuation

CIRIA C753 (The SuDS Manual) Table 24.6 notes that regarding interception design, the proposed SuDS measures can be considered to provide Interception, i.e. it can be assumed that there will be zero runoff from the first 5 mm rainfall for 80% of events during the summer and 50% in winter.

5.3.3 Conclusion

The existing lagoon has sufficient capacity to attenuate flows from Greenpark and adjoining lands for the contributing areas noted in previous Table 5.3. Attenuation is required from the office campus development/commercial development as the Greenpark masterplan has a contributing area greater than the permissible 14.561ha as noted in Table 5.3.

The SuDS measures will decrease the impact of the development on the receiving environment by improving water runoff quality and reducing water runoff quantity. The SuDS measures will also provide an amenity to residents and a biodiversity element to the development.

6.0 TRAFFIC AND TRANSPORTATION

6.1 Executive Summary

The Greenpark Masterplan illustrates a mixed use development vision for the lands consisting of an office campus (39,500 sq m); 834 no. residential units (including houses, duplexes and apartments); neighbourhood centre; nursing home (120 no. beds); crèche and open space provision with related car parking, ancillary services and roads infrastructure. The primary access to the site for the Masterplan development is via Junction 1 (Greenpark Roundabout) on the N69 with a potential future link road envisaged to the Alandale Roundabout. It is considered that the addition of a link road to the Alandale Roundabout would reduce the trip generation from the Masterplan associated with Greenpark Roundabout on the Dock Road. An access to Greenpark Avenue has been provided to accommodate a minimal number of residential units in the interest of orderly development and to satisfy fire tender access requirements and should be considered a local access only.

It is proposed that the nursing home development will be accessed from the South Circular Road via Log Na gCapall. Trip generation associated with the nursing home will be minimal and will occur at off peak times. Preliminary Junction 9 analysis predicts that by Design Year 2039, Greenpark Roundabout and the Dock Road by extension are predicted to be able to cater for the additional traffic loading from the masterplan development while still performing well within the context of an urban setting such as Limerick City.

Following traffic and transport assessment discussions with Limerick City and County Council, additional junction analysis will need to be undertaken for the Alandale Roundabout and the Cahirduff/Dock Road signalised junction. Predicted traffic from the development will be apportioned, which will further reduce development traffic onto the Dock Road.

6.2 Road Network

6.2.1 Existing Road Network and Site Location

The site location in relation to the wider road network is detailed in Figure 6.1. The Dock Road (N69) is a two-way road serving as one of the main access roads for the City. The proposed development is located in Greenpark, approximately 2 km to the southwest of Limerick City. The main access to the site is via a link road off the Limerick Greyhound Roundabout. The Greyhound Roundabout further links north to Greenpark Roundabout. An additional local access is proposed via Greenpark Avenue accessed from the South Circular Road to service a minimal number of housing units and to provide additional fire tender access points. Access from the South Circular Road via Log Na gCapall is proposed for the nursing home development. As part of the Masterplan, there is a potential for an extended link road to tie-in with the existing Alandale Roundabout to the north-east of the proposed development.

A traffic survey of the existing Greenpark Roundabout was undertaken by IDASO Traffic Surveys and Data Collection Contractors on Tuesday 6th of February 2018. The survey was carried out while schools were in term. It was not deemed necessary to provide traffic analysis of the Limerick Greyhound Roundabout, as the current main usage of this existing roundabout is for out of peak traffic times for access to the Stadium in the evenings. The proposed development is not expected to have a large impact on this roundabout and it is sufficiently sized to cater for the proposed development traffic volumes.



Figure 6.1: Existing Road Network, Masterplan located in red (<https://www.google.com/maps>)

The survey references as shown in Figure 6.1 are as follows:

- i. Junction 1 – Greenpark Roundabout

The survey found that the morning peak hour traffic flow occurred between 08:00 and 09:00 for the existing Greenpark Roundabout. The evening peak hour occurred between 15:45 and 16:45. The survey results are summarised in Figure 6.2 below.

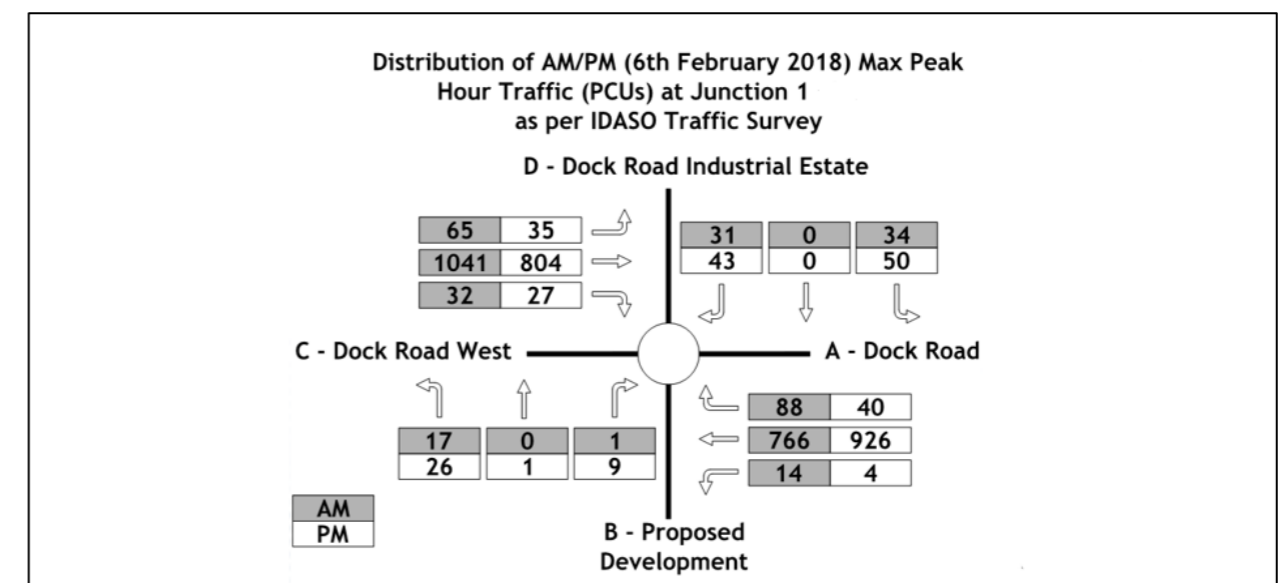


Figure 6.2: Illustration of distribution of AM/ PM Peak traffic (PCUs) at existing Junction 1 as per traffic survey Tuesday, 6th February 2018.

6.2.2 Proposed Masterplan Development

As noted above, the proposed Masterplan consists of residential units, an office campus, neighbourhood centre, café/restaurant, a crèche and nursing home.

The primary access to the site for the Masterplan development is via Junction 1 (Greenpark Roundabout) on the N69 with a potential link road to the Alandale Roundabout. It is envisaged that the addition of a link road to the Alandale roundabout at some future stage, subject to the appropriate third party agreements, would reduce the trip generation from the Masterplan associated with Greenpark Roundabout on the Dock Road.

The Greenpark Avenue access should be considered a local access and shall only accommodate a minimal number of residential units in the interest of orderly development and to satisfy fire tender access requirements. Access from the South Circular Road via Log Na gCapall for the nursing home development shall only accommodate minimal trip generation at off peak times and should be considered a local access.

Following traffic and transport assessment discussions with Limerick City and County Council, additional junction analysis will need to be undertaken for the Alandale Roundabout and the Cahirduff/Dock Road signalised junction. Predicted traffic from the development will be apportioned, which will further reduce development traffic onto the Dock Road.

a) Greenpark Avenue Access

Planning permission was previously granted for the construction of 31 No. Residential Units (see Reg. Ref 171190) on lands adjacent to the Greenpark Masterplan area on Greenpark Avenue.

As part of this grant of permission, 2 no. future access routes are to be provided to tie-in with the orderly development of lands within Greenpark. A minimal number of residential units will access Greenpark Avenue from the Greenpark Masterplan development as per Figure 6.3. Please note that the residential units shown in Figure 6.3 are for reference only to facilitate discussion.

Cycle lanes/ pedestrian footways will be integrated within the design to ensure connectivity between the Dock Road and the South Circular Road in accordance with the Draft Limerick/ Shannon Transport Strategy 2040.

b) Alandale Roundabout Access

As part of a review of the apportionment of traffic associated with the Greenpark Masterplan, there is potential for a future link road to the Alandale Roundabout, subject to appropriate third party agreement, as per Figure 6.4. It is envisaged that the addition of a link road to the Alandale Roundabout would reduce the trip generation from the Masterplan associated with Greenpark roundabout onto the Dock Road.

Cycle lanes/ pedestrian footways will be integrated within the design to ensure connectivity between the Dock Road and the South Circular Road in accordance with the *Draft Limerick/ Shannon Transport Strategy 2040*.



Figure 6.3: Greenpark Avenue proposed residential development (purple line: Reg. Ref: 171190)



Figure 6.4: Alandale Roundabout Potential Future Link Road

c) Log Na gCapall Access

It is proposed that the nursing home development will be accessed from the South Circular Road via Log Na gCapall. Trip generation associated with the nursing home will be minimal and will occur at off peak times. Please note that the nursing home layout shown in Figure 6.5 is for reference only to facilitate a discussion. Cycle lanes/ pedestrian footways will be integrated within the design to ensure connectivity between the Dock Road and the South Circular Road in accordance with the *Draft Limerick/ Shannon Transport Strategy 2040*.



Figure 6.5: Log Na gCapall – Proposed Nursing Home Access

6.2.3 Internal Layout

The proposed development has been assessed for compliance with “*Design Manual for Urban Roads and Streets*” (DMURS) published by the Department of Transport, Tourism and Sport & the Department of Environment, Community and Local Government.

DMURS sets out design guidance and standards for constructing new and reconfigured existing urban roads and streets. It also sets out practical design measures to encourage more sustainable travel patterns in urban areas.

The primary objectives of DMURS are as follows:

- i. Prioritise pedestrians and cyclists in urban settings without unduly compromising vehicular movement.
- ii. Provide good pedestrian permeability and connectivity in urban environments in order to encourage walking.
- iii. Implement speed reduction measures to provide safe interaction between pedestrians, cyclists and motorists.
- iv. Create attractive streetscapes through the design of roads and footpaths with careful consideration given to landscaping and selection of surface finishes.

Internal cycle lanes and footways will form part of the development and have been located adjacent to the future Link Roads to encourage pedestrian movement and cycling in line with the requirements of the *Limerick City and County Development Plan 2010-2016* (as extended) and in accordance with the *Draft Limerick/ Shannon Transport Strategy 2040*. The proposed Masterplan will include cycle lane/footpath connectivity through the site to facilitate connecting the Dock Road and the South Circular Road. Additional pedestrian/ cycle access points will be provided to the boundary of Log na gCapall and Greenpark Avenue.

Access to all buildings by a fire appliance can be provided. Delivery vehicles will be able to access and leave the site by provision of appropriate turning heads.

Due to the road layouts and nature of the development, it is envisaged that traffic will be moving at a slow speed. Traffic management by means of road markings and signage will be supplied within the development where necessary.

6.2.4 External Factors

Currently, there are discussions ongoing between Limerick City and County Council (LCCC) and the National Transport Authority (NTA) in relation to the upgrade of the Dock Road to have enhanced public transportation/ alternative modal facilities including priority bus corridors and dedicated cycle lanes.

As part of the constraints assessment for the Limerick Northern Distribution Road (LNDR), a traffic study was undertaken by Roughan O’Donovan to provide forecasted values for the junctions surrounding Limerick City and the potential associated reduction in traffic in the city. With the opening of the LNDR, it is envisaged that a portion of the traffic utilising the Dock Road will decrease in the AM and PM peaks as

more viable routes become available in the city. The impact of the LNDR on Greenpark Roundabout capacity will be further explored once further information is available from LCCC.

The proposed Masterplan has taken consideration of the *Draft Limerick/ Shannon Transport Strategy 2040*. Under the strategy, cycling infrastructure will be developed along a number of primary routes. Namely, a Primary Radial Route between Mungret to City Centre along the R510, R526 Ballinacurra Rd, South Circular Road and Henry Street. A Secondary Cycle Network from Dock Road via Ashbourne Avenue to Rosbrien Road and a Greenway Cycle Network for the Limerick Docks parallel to the N69.

In addition, there will be a bus route via the Dock Road which will help alleviate traffic as people accessing the city will be able to use public buses rather than cars.

6.2.5 Junction Analysis

Capacity analysis was carried out using the relevant software package (Junction 9 for Greenpark Roundabout initially being studied). The program permits the capacity of a junction/roundabout to be assessed with respect to existing or forecasted traffic movements and volumes for a given time period. The capacity for each movement possible at the junction/roundabout being assessed is determined from geometric data input into the program with the output used in the assessment.

Given the nature of the proposed development, it is expected it will have a direct impact on both the existing AM and PM peak times surveyed on Greenpark Roundabout.

The baseline traffic will continue to grow at the levels recommended by TII in their '*Link-Based Traffic Growth forecasting*' document. The year of opening of the scheme was assumed to be 2024. A 15-year analysis period for the scheme would give a design year of 2039.

The existing Greenpark Roundabout was analysed for the following traffic flow scenarios:

- i. 2018 Existing Survey Year weekday AM and PM peak hour flows without the proposed development in place;
- ii. 2024 Opening Year weekday AM and PM peak hour flows with and without the proposed development in place;
- iii. 2029 Design Year weekday AM and PM peak hour flows with and without the proposed development in place;
- iv. 2039 Design Year weekday AM and PM peak hour flows with and without the proposed development in place

Preliminary Junctions 9 analysis predicts that by Design Year 2039, Greenpark Roundabout and the Dock Road by extension are predicted to be able to cater for the additional traffic loading from the Masterplan development, while still performing well within the context of an urban setting such as Limerick City.

Following traffic and transport assessment discussions with Limerick City and County Council, additional junction analysis will need to be undertaken for the Alandale Roundabout and the Cahirduff/Dock Road signalised junction. Predicted traffic from the development will be apportioned, which will further reduce development traffic onto the Dock Road.

6.2.6 Conclusion

The Greenpark Masterplan illustrates a mixed use development vision for the lands consisting of an office campus (39,500 sq m); 834 no. residential units (including houses, duplexes and apartments); neighbourhood centre; nursing home (120 no. beds); crèche and open space provision with related car parking, ancillary services and roads infrastructure. The primary access to the site for the Masterplan development is via Junction 1 (Greenpark Roundabout) on the N69 with a potential future link road to the Alandale Roundabout. It is envisaged that the addition of a link road to the Alandale roundabout would reduce the trip generation from the Masterplan associated with Greenpark Roundabout on the Dock Road.

An access to Greenpark Avenue has been provided to accommodate a minimal number of residential units in the interest of orderly development and to satisfy fire tender access requirements and should be considered a local access only.

It is proposed that the nursing home development will be accessed from the South Circular Road via Log na gCapall. Trip generation associated with the nursing home will be minimal and will occur at off peak times.

Internal cycle lanes and footways will form part of the development and have been located adjacent to the future Link roads to encourage pedestrian movement and cycling in line with the requirements of the Limerick City and County Development Plan 2010-2016 (as extended) and in accordance with the Draft Limerick/ Shannon Transport Strategy 2040. The proposed masterplan will include cycle path/ footpath connectivity through the site to facilitate connecting the Dock Road and the South Circular Road. Additional pedestrian/ cycle access points will be provided to the boundary of Log na gCapall and Greenpark Avenue.

Background traffic flows at the Greenpark Roundabout were determined using observed peak hour classified traffic counts obtained from a traffic count by IDASO Traffic Surveys and Data Collection Contractors undertaken on Tuesday 6th of February 2018.

The survey found that the morning peak hour traffic flow occurred between (08:00-09:00) and the evening peak hour occurred between (15:45-16:45) for the Greenpark Roundabout. Capacity analysis was carried out using the software package Junctions 9 for the Greenpark Roundabout being studied during the AM and PM peaks 2018 Existing Survey Year, 2024 Opening Year, 2029 Design Year & 2039 Design Year.

Preliminary Junctions 9 analysis predicts that by Design Year 2039, Greenpark Roundabout and the Dock Road by extension are predicted to be able to cater for the additional traffic loading from the masterplan development while still performing well within the context of an urban setting such as Limerick City.

Following traffic and transport assessment discussions with Limerick City and County Council, additional junction analysis will need to be undertaken for the Alandale Roundabout and the Cahirduff/Dock Road signalised junction. Predicted traffic from the development will be apportioned which will further reduce development traffic onto the Dock Road.

7.0 BIODIVERSITY STRATEGY

7.1 Introduction

Ecology Ireland Wildlife Consultants Ltd. were commissioned to carry out detailed desktop and field surveys of the Greenpark site, on the western edge of Limerick city. A team of specialist ecologists have carried out intensive surveys at the former Limerick Race Course site early from June 2020. The team was led by Dr. Gavin Fennessy (BSc PhD MCIEEM; Birds & Mammals) and other key contributors were Ross Macklin (Aquatic Ecology), Claire Deasy (Habitats & Botanical), Tom O'Donnell (Bats, General Ecology) and Marie Kearns (Botanical, General Ecology).

The focus of the ecological studies has been the Masterplan Area (Figure 7.1 overleaf) as well as adjoining lands and areas of conservation importance located in proximity to the site. Key ecological receptors identified are detailed under the following headings:

- Designated Sites;
- Habitats & Flora;
- Terrestrial Fauna and;
- Aquatic Ecology.

The aim of these studies has been to understand the nature of the receiving environment and to highlight any particular constraints or issues that may inform the future development and design of the Masterplan area. The methods and scope of the various ecological studies are summarised along with some key findings.

7.2 Designated Conservation Area

The avoidance of potential significant impacts on European Designated Sites, Special Areas of Conservation (SAC's) and Special Protection Areas (SPA's), and nationally designated sites, Natural Heritage Areas (NHA's) and Proposed Natural Heritage Areas (pNHA's), are key considerations informing the Masterplan design. The EU and Nationally designated sites within 15km of the Masterplan Area are summarised in Table 7.1 below and illustrated in Figures 7.2, 7.3 and 7.4. The distance from the Masterplan area to EU and national designated sites is also shown in Table 7.1. The Masterplan Area is located within and adjacent to two EU Designated Sites:

- **Lower River Shannon SAC (002165)** - western edge of the Masterplan Area is within this SAC.
- **River Shannon & River Fergus Estuaries SPA (004077)** - located 10m to the north of Masterplan Area.

The Lower River Shannon SAC is designated for a range of habitats (e.g., Alluvial woodland) listed on Annex I and a range of species (e.g., Otter, Atlantic Salmon) listed on Annex II of the EU Habitats Directive. The River Shannon & River Fergus Estuaries SPA is of great ornithological interest, being of international importance on account of the numbers of wintering birds it supports. The full list of qualifying features of these designated sites is provided in Appendix 7.0.

Table 7.1: Minimum distance to designated conservation sites.		
Site Name	Site Code	Minimum Distance (km)
<i>Natura 2000 sites</i>		
Lower River Shannon SAC	002165	0
River Shannon & River Fergus Estuaries SPA	004077	0.01
Tory Hill SAC	000439	11.2
Glenomra Wood SAC	001013	12.2
Askeaton Fen Complex SAC	002279	12.4
Curraghchase Woods SAC	000174	14.4
Ratty River Cave SAC	002316	14.6
<i>Nationally Designated Sites</i>		
Inner Shannon Est. - South Shore pNHA	000435	0.02
Fergus Est. & Inner Shannon - North Shore pNHA	002048	0.6
Loughmore Common Turlough pNHA	000438	2.3
Knockalisheen Marsh pNHA	002001	3.2
Garranon Wood pNHA	001012	7.3
Woodcock Hill NHA	002402	7.3
Cloonlara House pNHA	000028	8.2
Castleconnell pNHA	000433	9.6
Dromore & Bleach Loughs pNHA	001030	9.9
Tory Hill pNHA	000439	11.2
Adare Woodlands pNHA	000429	11.4
Skollhill pNHA	001996	11.6
Glenomra Wood pNHA	001013	12.2
Castle Lake pNHA	000239	14.2
Gortacullin Bog NHA	002401	14.2
Curraghchase Woods pNHA	000174	14.4



Figure 7.1: Site Location and Local Hydrological Features

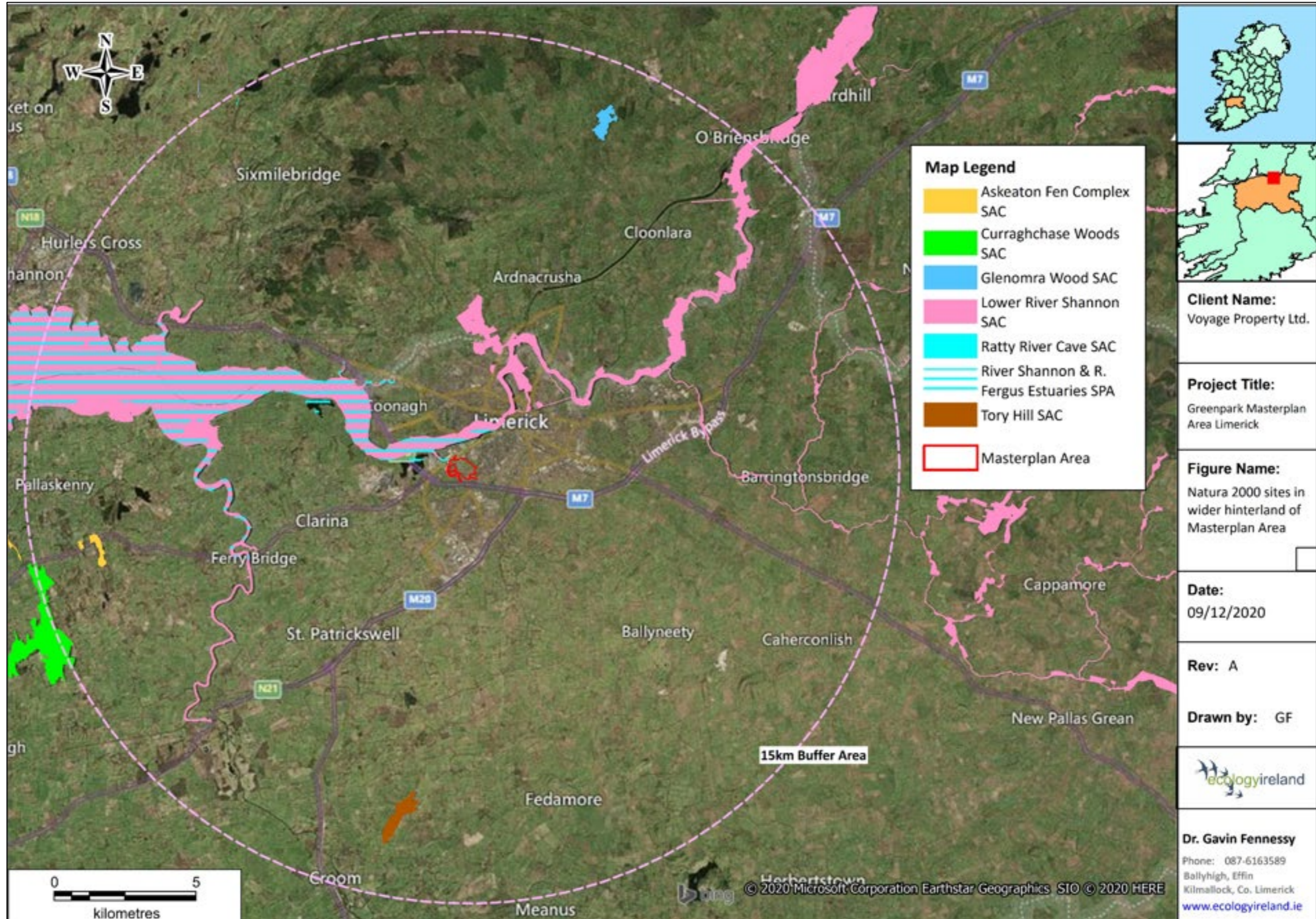


Figure 7.2: Natura 2000 sites within 15km of the Masterplan area.



Figure 7.3: Natura 2000 sites proximate to the Masterplan area.

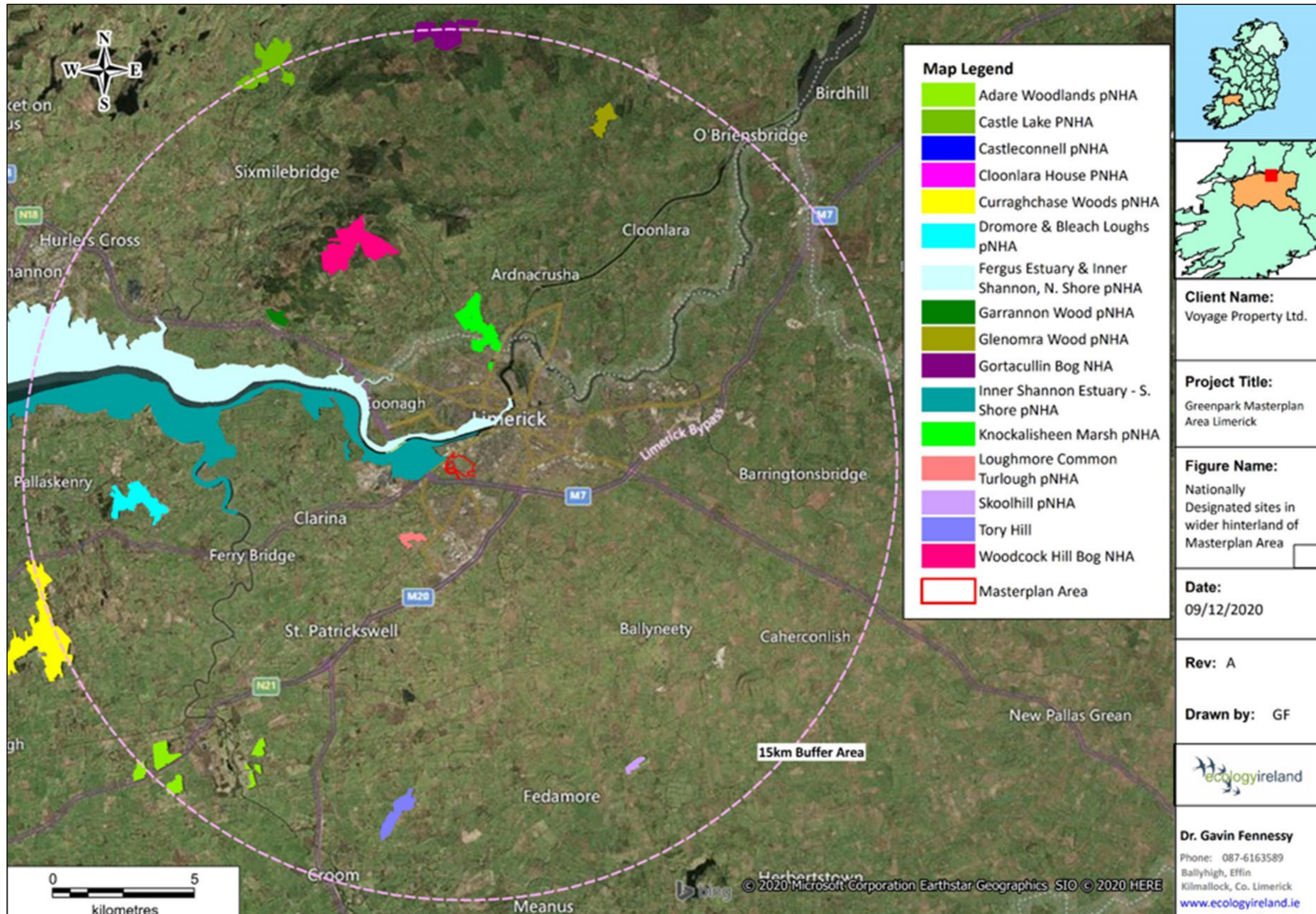


Figure 7.4: Nationally designated conservation sites within 15km of the Masterplan area.

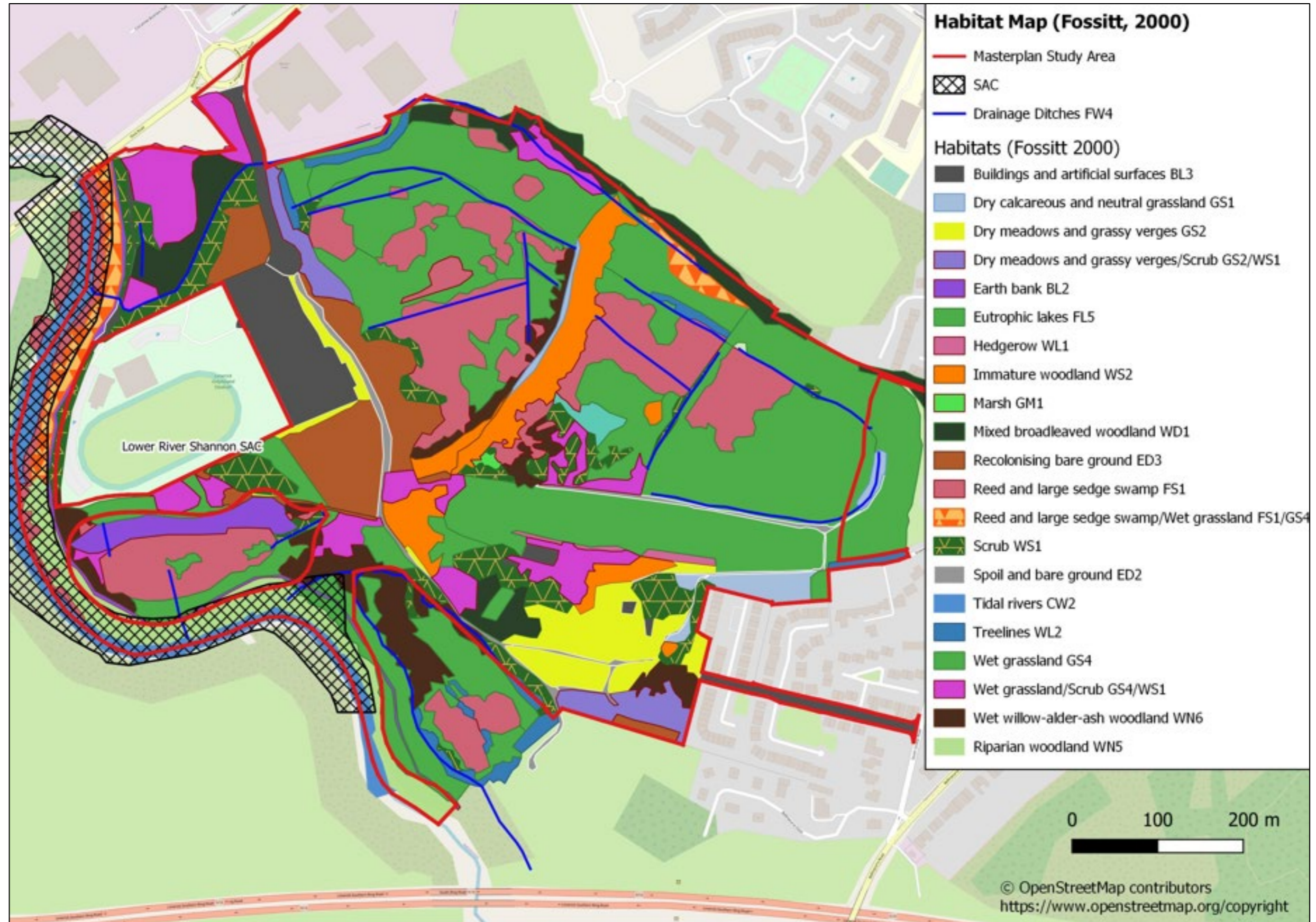


Figure 7.5: Habitat map of Masterplan study area with habitats classified according to Fossitt (2000).

7.3 Habitat and Botanical Study

The habitat and flora study involved undertaking a desktop review and a baseline field assessment of the habitats and flora within the study area. The desktop study involved a review of botanical data available for the area to identify botanical species of conservation interest (e.g. rare, legally protected, invasive species) which have historically occurred in the area. The habitat and flora field assessment was carried out in accordance with best practice guidance (Smith *et al.* 2011). This involved a walkover of the study site on a number of occasions between June and July 2020 where the dominant habitats present were mapped and classified according to Fossitt (2000). Evaluation of the conservation importance of habitats was conducted in accordance with NRA (2009) and Nairn & Fossitt (2004). The correspondence of any habitats within the study area to those listed on Annex I of the EU Habitats Directive 92/43/EC was evaluated with reference to the European Commission (2013) and the NPWS (2013). The conservation status of habitats and flora was also considered in respect of the following: Irish Red List for Vascular Plants (Wyse Jackson *et al.* 2016); Irish Red List for Bryophytes (Lockhart *et al.* 2012), Flora Protection Order (1999 as amended 2015); the EU Habitats Directive (92/43/EEC).

7.3.1 Desktop Study

Three Red listed 'Near threatened' plant species (Wyse-Jackson *et al.*, 2016) have historically been recorded within the 2km grid squares (R55S & R55M) that overlap the study site: these are Triangular club rush (*Schoenoplectus triquetus*), Opposite leaved pond weed (*Groenlandia densa*) and Least Bur-reed (*Sparganium natans*). Within the wider 10km grid square three further Flora Protection order species have historically occurred, Penny Royal (*Mentha pulegium*), Meadow Barley (*Hordeum secalinum*) and Autumn Crocus (*Colchicum autumnale*). None of these species were recorded during the field element of the habitat and botanical survey in 2020. Four species classified as a 'risk of high impact invasive species' (Kelly *et al.* 2013) and which are also listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 are recorded in the R55S and R55M 2km national grid square that overlap the study site these include Japanese Knotweed, Giant hogweed, Nuttall's waterweed and Canadian waterweed. None of these species were recorded during the current 2020 habitat survey within the Masterplan Study Area.

7.3.2 Key Findings - Habitats

The main habitats recorded within the Study area are listed in Table 7.2 and illustrated in Figure 7.5 Habitat map of the study area. The habitats within the study area reflect a landscape that has been the subject of considerable anthropogenic influence in the past having undergone reclamation, drainage and land improvement measures. The lands within the study area are currently not being actively managed apart from light grazing by a number of horses. While the anthropogenic influence remains quite evident, over time, the habitats onsite have gradually become more naturalised, vegetation has recolonised bare ground, tracks and demolished building areas, willow scrub (WS1) and immature woodland (WS2) are developing into more established semi-mature Wet willow-alder-ash woodland (WN6) dominated by willow species.

What was former amenity grassland is now reverting to wet grassland (GS4) and swamp habitat (FS1 & FS2) owing to the underlying hydrological conditions based as it is in a natural flood plain where the water table is high. The wet grassland (GS4), Reed and large sedge swamps (FS1) and Tall herb swamps (FS2) are evaluated as being of **Local Importance (higher value)** given the specialist plants that grow in this habitat and the range of species (flora, invertebrate, bird, mammals) it can support. The grassland habitat is diversified somewhat by the underlying limestone bedrock and as a result Dry calcareous and neutral grassland (GS1) can be found in a number of areas across the site. Species richness is high in these areas and specialist calcareous plant assemblages indicative of this grassland were present including Quaking

Oat Grass (*Briza media*) and a number of orchid species including Common Spotted Orchid (*Dactylorhiza fuchsia*), Bee Orchid (*Ophrys apifera*) and Pyramidal Orchid (*Anacamptis pyramidalis*). None of these orchid species are Flora Protection Order 2015 species. All of the orchids recorded in the study area are listed as species of Least Concern on the Vascular Plant Red List (after Wyse-Jackson *et al.*, 2015).

Table 7.2: List of the main habitats recorded within or directly adjacent to the masterplan area during the 2020 Habitat and botanical Survey (Evaluation of conservation importance after NRA 2009 and Nairn & Fossitt 2004).

Fossitt Code	Habitat Type	Habitat Evaluation
WN5	Riparian woodland	International Importance (located in the Lower River Shannon SAC)
WN6	Wet willow-alder-ash woodland	Local Importance (Higher value)
WD1	Mixed Broadleaved Woodland	Local Importance (Higher value)
WSI	Scrub	Local Importance (Lower value)
WS2	Immature woodland	Local Importance (Lower value)
WL1	Hedgerows	Local Importance (Higher value)
WL2	Treelines	Local Importance (Higher value)
GS4	Wet Grassland	Local Importance (Higher value)
GS2	Dry meadows and grassy verges	Local Importance (Higher value)
GS1	Dry calcareous and neutral grassland	Local Importance (Higher value)
FS1	Reed and large sedge swamp	Local Importance (Higher value) and International Importance inside the SAC
FS2	Tall Herb Swamp	Local Importance (Higher value)
CW2	Tidal Rivers	International Importance
FL4	Eutrophic lakes	Local Importance (Higher value)
FW4	Drainage Ditches	Local Importance (Lower value) along northern boundary of site and Local Importance (Higher value) elsewhere
ED2	Spoil and bare ground	Local Importance (Lower value)
ED3	Recolonising bare ground	Local Importance (Lower value)
BL2	Earth bank	International Importance due to location in Lower River Shannon SAC
BL3	Buildings and artificial surfaces	Local Importance (Lower value)

Other species recorded onsite indicative of the calcareous conditions included the Greater Knapweed (*Centaurea scabiosa*) which is currently categorised as near threatened in the vascular plant Red List (Wyse-Jackson *et al.*, 2015). The areas of Dry calcareous and neutral grassland were evaluated as **Local Importance (Higher Value)**. The historical development of the site is reflected in habitats such as Spoil and bare ground (ED2), Buildings and Artificial surfaces (BL3) and Recolonising bare ground (ED3) where pioneer plant species have gradually recolonised these disturbed areas.

The disturbed areas were also where non-native invasive plant species were concentrated within the study area. The Lower River Shannon SAC is a key ecological receptor which lies within the Masterplan Area; there is both habitat and hydrological connectivity between the Study area and this SAC. Ballynaclogh River a tributary of the River Shannon which forms part of the Lower River Shannon SAC runs along the western boundary of the study area (Figure 7.1). It is tidal at this point with a muddy substrate lined with monodominant stands of Common Reed (*Phragmites australis*) in the north west and Riparian woodland (WN5) to the south west.

A number of Flora Protection Order (2015) species are known to occur along the Ballynaclogh River including Triangular Club-rush (*Schoenoplectus triqueter*) and Opposite Leaved Pondweed (*Groenlandia densa*), these were recorded during the aquatic ecology assessment and are referred to in Section 7.4. The Ballynaclogh River was evaluated as being of **International Importance** as it forms part of the EU designated site, the Lower River Shannon SAC.

The conservation value of habitats in general across the site are evaluated of Local Importance and range from lower to higher value. Habitat of international importance only occurs within the EU Designated site, the Lower River Shannon SAC, which is lies on the western margins of the Masterplan Area.

A large man-made earth embankment (BL2) runs between the Ballynaclogh River and the Study Area, which was built in the past as part of historical arterial drainage scheme works. Drains running in the north of the study area and from the Constructed Wetlands adjacent to the site run through this earth embankment and discharge into the Ballynaclogh River. The Earth bank forms a natural barrier between the proposed development and the Ballynaclogh River, it is evaluated as being of **International Importance** in light of the support function it provides to the adjacent habitats, which form part of the Lower River Shannon SAC and it being itself partially located within the SAC.

Woodland habitat onsite is dominated by semi-mature willow species indicative of the underlying wetter hydrological conditions. Four main types of woodland were recorded Wet willow-alder-ash woodland (WN6), Riparian woodland (WN5), Mixed broadleaved woodland (WD1) and Scrub (WS1). None were evaluated as corresponding to Annex I habitat, the Riparian Habitat that runs along the Ballynaclogh River, a portion of which is located within the Masterplan area, is evaluated as being of **International Importance** as it forms part of the Lower River Shannon SAC. All other woodland types were classified as being of **Local Importance with a lower to higher value**.

7.3.3 Non-native Invasive Species

No plant species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (i.e. species of which it is a legal offense to disperse, spread or otherwise cause to grow in any place) or classified as a 'risk of high impact invasive species' (Kelly et al. 2013) were recorded within the study site. In total five non-native invasive plant species were recorded during the 2020 habitat survey including:

- Himalayan honeysuckle (*Leycesteria formosa*);
- Fuchsia (*Fuchsia magellanica*)
- Buddleia (*Buddleja davidii*)
- Travellers Joy (*Clematis vitalba*)
- Montbretia (*Crocsmia pottsii* x *aurea* = *C. x crocosmiiflora*)
- Sycamore (*Acer pseudoplatanus*)

Himalayan honeysuckle, Travellers Joy and Buddleia are classified as a 'risk of medium impact invasive species' (Kelly *et al.* 2013) but not listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011. Fuchsia and Montbretia are not as yet classified.



Plate 7.1a: Areas of Reed and large sedge swamp (FS1) dominated by Lesser Pond Sedge and **Plate 7.1b:** Mono-dominant stands of Common Reed (*Phragmites australis*) that line the banks of the Ballynaclogh River.



Plate 7.2a and Plate 7.2b: Bee Orchid and Common Spotted Orchid recorded in areas of Dry calcareous and neutral grassland (GS1) habitat.



Plate 7.3a: Reed and large sedge swamp habitat (FS1). **Plate 7.2b** Wet grassland (GS4) being grazed by local horses.



Plate 7.3a and Plate 7.3b: The 'Medium Risk' invasive plant species- Buddleia (Butterfly bush) and Himalayan honeysuckle both frequently recorded within the study area on disturbed ground and along tracks/access roads.

7.4 Terrestrial Fauna

A desktop study was carried out to collate information on the terrestrial fauna known or likely to occur in the area, with the aim of identifying species of conservation interest (e.g. rare, protected), previously recorded for the relevant national grid squares overlapping the study site.

7.4.1 Bird Survey

General breeding bird usage at the study site was assessed using a series of standard belt transects (after Bibby *et al.* 2000). A total of five 500m transects were surveyed in June & July 2020 (Figure 7.6). All birds seen and/or heard within 0-25m and 25-100m from the surveyor were recorded. Birds observed or heard beyond 100m from each transect were also recorded (>100m distance band). Bird species observed during other aspects of the biodiversity field studies but outside of the dedicated breeding transect were also noted as casual observations. The breeding surveys carried out at the site in the summer of 2020 represent the only site-specific data collected in the masterplan area in over a decade. Winter surveys will be carried out at the site over the winter of 2020/2021 and will include a night-time walkover (using thermal monoscopes) to assess the usage of the site by roosting and nocturnally active species.

The conservation status of bird species recorded during the survey and as part of the online desktop review was assessed with reference to; the EU Birds Directive (2009/147/EC) Annex I list and Birds of Conservation Concern in Ireland; (BoCCI, Colhoun & Cummins, 2013). For the BoCCI list, Red-listed species are of high conservation concern in Ireland, Amber-listed species are considered of medium conservation concern, while Green-listed species are not of conservation concern in Ireland at present. Bird species listed on Annex I of the EU Birds Directive are considered of high conservation concern across Europe.

a) Key Findings – Birds

The NBDC dataset for the birds recorded in the overlapping 1km Grid Squares (R555 & R565) and 2km Grid Squares (R55M & R55S) reflects the nature and range of habitats present. Terrestrial and aquatic species are well represented. Similarly, previous planning applications at this site provide a good historical source of data on the occurrence of certain species in the area (e.g. CSR, EIS 2006). Given the relatively unmanaged nature of the site in the past two decades there has been scrub and woodland encroachment and the nature of the habitats present are likely to reflect this pattern of change.

A total of 41 bird species were recorded during the transect surveys in summer 2020 (Table 7.3). Two Red-listed species were recorded during the transect survey Meadow Pipit and Herring Gull. The species recorded include birds typical of woodland and farmland e.g. Robin, Chaffinch and Wren and also migrant flycatchers such as Swallow, Sand Martin and Swift. Birds of open and semi-improved/wet-grassland are also well represented in the bird community at the site e.g. Linnet, Reed Bunting and Stonechat.

A number of additional species were recorded as casual observations during the course of other surveys at the site (Table 7.4). These additional records included two further Red-listed species, Black-headed Gull and Grey Wagtail. Two raptor species were also noted with Kestrel suspected to have bred at the site. There were a number of sightings of Buzzards within the study area, particularly in the post breeding period. Three juvenile Buzzards were observed together in flight to the south of the Greyhound Stadium on July 20th 2020.

Table 7.3: Birds species recorded as part of the bird survey transects.	
Common Name	Scientific Name
Blackbird	<i>Turdus merula</i>
Blackcap	<i>Sylvia atricapilla</i>
Blue Tit	<i>Cyanistes caeruleus</i>
Bullfinch	<i>Pyrrhula pyrrhula</i>
Chaffinch	<i>Fringilla coelebs</i>
Chiffchaff	<i>Phylloscopus collybita</i>
Coal Tit	<i>Parus ater</i>
Cormorant [^]	<i>Phalacrocorax carbo</i>
Dunnock	<i>Prunella modularis</i>
Feral Pigeon	<i>Columba l. livia</i>
Goldcrest [^]	<i>Regulus regulus</i>
Goldfinch	<i>Carduelis carduelis</i>
Great Tit	<i>Parus major</i>
Greenfinch [^]	<i>Carduelis chloris</i>
Herring Gull*	<i>Larus argentatus</i>
Hooded Crow	<i>Corvis cornix</i>
Jackdaw	<i>Corvus monedula</i>
Jay	<i>Garrulus glandarius</i>
Lesser Black-backed Gull [^]	<i>Larus fuscus</i>
Lesser Redpoll	<i>Carduelis cabaret</i>
Linnet [^]	<i>Carduelis cannabina</i>
Long-tailed Tit	<i>Aegithalos caudatus</i>
Magpie	<i>Pica pica</i>
Meadow Pipit*	<i>Anthus pratensis</i>
Pheasant	<i>Phasianus colchicus</i>
Raven	<i>Corvus corax</i>
Reed Bunting	<i>Emberiza schoeniclus</i>
Robin [^]	<i>Erithacus rubecula</i>
Rook	<i>Corvus frugilegus</i>
Sand Martin [^]	<i>Riparia riparia</i>
Sedge Warbler	<i>Acrocephalus schoenobaenus</i>
Siskin	<i>Carduelis spinus</i>
Song Thrush	<i>Turdus philomelos</i>
Starling [^]	<i>Sturnus vulgaris</i>
Stonechat [^]	<i>Saxicola torquata</i>
Swallow [^]	<i>Hirundo rustica</i>
Swift [^]	<i>Apus apus</i>
Whitethroat	<i>Sylvia communis</i>
Willow Warbler	<i>Phylloscopus trochilus</i>
Woodpigeon	<i>Columba palumbus</i>
Wren	<i>Troglodytes troglodytes</i>

Table 7.4: Additional bird species recorded as casual records at the site in summer/autumn 2020	
Common Name	Scientific Name
Black-headed Gull*	<i>Chroicocephalus ridibundus</i>
Buzzard	<i>Buteo buteo</i>
Collared Dove	<i>Streptopelia decaocto</i>
Grey Heron	<i>Ardea cinerea</i>
Grey Wagtail*	<i>Motacilla cinerea</i>
Kestrel [^]	<i>Falco tinnunculus</i>
Skylark [^]	<i>Alauda arvensis</i>
Snipe [^]	<i>Gallinago gallinago</i>

7.4.2 Mammal (non-volant) Survey

A desktop review of data available on mammal occurrence in proximity to the study site was undertaken by consulting online databases. The mammal (non-volant) field assessment was undertaken by repeated walkovers in July and August 2020. The field element of the assessment involved a walkover of the study site, where direct and/or indirect observations were noted (e.g. breeding sites, droppings, prints) in accordance with standard guidelines (e.g. Hundt 2012, JNCC 2004, Sutherland 1996). The embankments along the edge of the Ballynaclogh were walked to record evidence of the presence of Otter.

In addition to the walkover, 11 digital wildlife cameras (Camera-traps) which take photographs and/or video when triggered by heat or motion, were also deployed to record mammal activity within the study site. The location where the cameras were deployed is shown in Figure 7.6. Evidence of mammal activity observed during other aspects of the biodiversity field studies but outside of the dedicated mammal walkover were also noted as casual species.

The conservation status of mammals was assessed with reference to the following: the Irish Wildlife Acts (1976 - 2012); the Red List of Terrestrial Mammals (Marnell *et al.* 2009); the EU Habitats Directive.

a) Non-volant mammal – Key Findings

A total of 9 mammal species (excluding livestock and domestic pets) were recorded on the wildlife cameras deployed at the site (Table 7.5). Of these several had not previously been recorded in the 2km Grid Squares in which the masterplan area is located (including Red Squirrel, Pine Marten, Stoat, Greater White-toothed Shrew, Mink). The most frequent and widespread of the non-volant mammals recorded at the site was Fox, closely followed by Wood Mouse. None of the species recorded is of conservation concern in Ireland.

Evidence of the presence of two further mammal species was noted during the walkover. An Irish Hare (*Lepus timidus hibernicus*) was recorded near the entrance gate into the site in August 2020. In addition, Otter (*Lutra lutra*) spraints were recorded at several points from the banks of the Ballynaclogh both upstream and downstream of the N18 bridge. The Ballynaclogh downstream of the bridge was walked in July 2020 and no holts were observed. Otters have a 'Least Concern' conservation status in Ireland but are considered Near Threatened in Europe and globally (Marnell *et al.* 2019). No breeding sites or burrows for any protected mammal species were recorded during the walkovers at the site.

Table 7.5: Mammal species identified on the wildlife camera record during 2020.		
Common Name	Scientific Name	Conservation Status
Fox	<i>Vulpes vulpes</i>	Least Concern
Mink	<i>Mustela vison</i>	n/a
Hedgehog	<i>Erinaceus europaeus</i>	Least Concern
Wood Mouse	<i>Apodemus sylvaticus</i>	Least Concern
Rat	<i>Rattus norvegicus</i>	n/a
Greater White-toothed Shrew	<i>Crocidura russula</i>	Invasive; n/a
Stoat	<i>Mustela erminea</i>	Least Concern
Red Squirrel	<i>Sciurus vulgaris</i>	Least Concern
Pine Marten	<i>Martes martes</i>	Least Concern



Plate 7.4: Fox was the most frequent and widely recorded mammal species on the wildlife cameras.

7.4.3 Bat Survey

A desktop review of data available on bat occurrence in proximity to the study site was undertaken by consulting online databases. All bat species occurring in Ireland are legally protected under the Irish Wildlife Acts (1976 - 2012). Under this protection, it is an offence to hunt or interfere with or destroy their breeding or resting places (unless under statutory licence/permission). Irish bat species are listed on Annex IV of the EU Habitats Directive, with Lesser Horseshoe Bat also listed on Annex II of this Directive.

A baseline bat study of the usage of the study site was achieved by undertaking a passive bat detector study in accordance with current best practice guidelines (Collins 2016, Kelleher & Marnell 2006). As the study site does not have any buildings/structures attractive to roosting bats, no bat roosting emergence/return study was undertaken. Passive bat detectors were deployed at seven locations across the site between June and October 2020 (Wildlife Acoustics SM4; Figure 7.6). All recorded bat registrations were analysed using Wildlife Acoustics Kaleidoscope Professional sound analysis software to confirm bat species, times of activity and behaviour where possible. The conservation status of bats was considered in respect of the following: Irish Wildlife Acts (1976 - 2018); Red List of Terrestrial Mammals (Marnell et al. 2009); EU Habitats Directive.

a) Bat Activity and Records- Key Findings

The NBDC online database also hosts the Model of Bat Landscapes for Ireland, which has assessed the relative importance of landscape and habitat associations for bat species across Ireland (see Lundy et al.

2011). The bat landscape suitability index for the area is high (43.67) with the landscape deemed particularly suitable for Leisler’s Bat (*Nyctalus leisleri*; 65) and Common Pipistrelle (*Pipistrellus pipistrellus*; 64). There are historic records of the presence of four bat taxa from the two 2km Grid Squares that encompass the masterplan area: Leisler’s Bat, Daubenton’s Bat, *Myotis daubentonii*, Soprano Pipistrelle, *Pipistrellus pygmaeus* and Pipistrelle species (probably Common/Soprano Pipistrelle).

There is very limited roosting potential for bats within the site as there is a lack of suitable structures and the open habitats and revegetating scrub/willow woodland provide negligible roosting opportunities for bats. There are some older trees and boundary walls with some limited potential to accommodate roosting bats but overall the site is more suitable for foraging and commuting individuals.

Analysis of the recordings to date has confirmed that the bat activity at the site is dominated by three species, with Common Pipistrelle alone responsible for almost 80% of the registrations analysed to date. Leisler’s Bat was the next most frequently recorded species (13.8% of total records), followed by Soprano Pipistrelle (6.1%). In keeping with the current guidance, the passive detectors will be deployed in the area throughout the year. Leisler’s Bat is common and widespread in Ireland but is considered ‘Near Threatened’ across the species’ range (Marnell et al. 2019).

7.4.4 Other Taxa

Field surveys during 2020 recorded a range of invertebrates and frequent observations of Common Frog, *Rana temporaria*. Frogs are an internationally important species and are protected under the Habitats Directive (92/43/EEC) and the Irish Wildlife Act (1976, as amended). The other taxa noted during the terrestrial ecology walkovers are presented in Table 7.6. There are also historical records of Common Lizard (*Zootoca vivipara*) from this area.

Table 7.6: Other taxa recorded as casual records during the terrestrial ecology surveys, 2020.	
Other Taxa	Scientific Name
Common Blue	<i>Polyommatus icarus</i>
Meadow Brown	<i>Maniola jurtina</i>
Small Tortoiseshell	<i>Aglais urticae</i>
Speckled Wood	<i>Pararge aegeria</i>
Ringlet	<i>Aphantopus hyperantus</i>
Peacock	<i>Aglais io</i>
Red Admiral	<i>Vanessa atalanta</i>
Painted lady	<i>Vanessa cardui</i>
Orange Tip	<i>Anthocharis cardamines</i>
Emperor Dragonfly	<i>Anax imperator</i>
Brown Hawker	<i>Aeshna grandis</i>
Four-spotted chaser	<i>Libellula quadrimaculata</i>
White-tailed bumblebee	<i>Bombus lucorum</i>
Common carder bee	<i>Bombus pascuorum</i>
Common Frog	<i>Rana temporaria</i>



Figure 7.6: Bird transects, bat detector and trail camera locations within the Masterplan Study Area.

7.5 Receiving Environment (Aquatic Ecology)

7.5.1 Surveys Undertaken

All watercourses within or adjoining the redevelopment site were considered as part of the current baseline assessment. This included two survey sites on the adjoining Ballinacurra Creek also known as Ballynaclogh River and ten survey sites on the drainage channel network located within or adjacent to the site boundary (Figure 7.7). Furthermore, a 1.3ha attenuation pond located outside but directly adjacent to the site also formed part of the aquatic baseline survey. Therefore, a total of thirteen survey sites were studied in the aquatic baseline assessment.

The baseline surveys focused on the ecological evaluation of aquatic habitats in relation to fisheries habitat, amphibians, macro-invertebrates, (physiochemical) water quality, macrophytes (aquatic plants), aquatic invasive species and other aquatic species of conservation value which may occur within the watercourses in the footprint of the Greenpark redevelopment site. Additionally, a desktop review was undertaken to collate available ecological datasets pertaining to the natural environment of the aquatic survey sites and wider Greenpark study area (e.g. NBDC & NPWS data).

The ecological significance of each aquatic survey site was evaluated according to the 'Guidelines for Assessment of Ecological Impacts of National Road Schemes' (NRA, 2009).

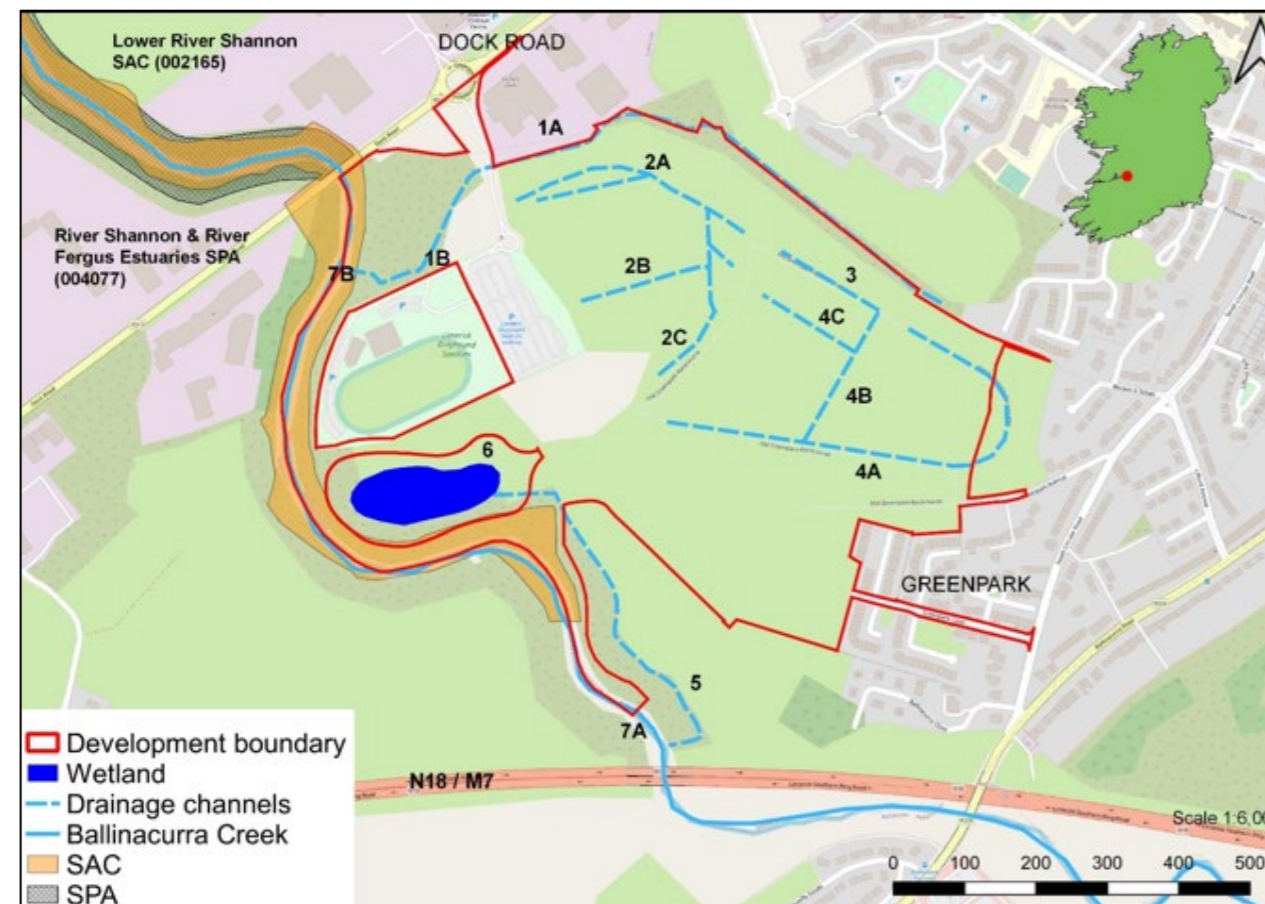


Figure 7.7: Overview of aquatic survey site locations

7.5.2 Key findings

The development site features a number of small drainage channels, mostly concentrated around the former racecourse (i.e. north-west and central zones). Some of these channels are seasonal (i.e. dry out for much of the year), with some retaining water on a more persistent basis. Inherently, those sites with higher water volumes (e.g. survey sites 1A/1B, 2A, 5 – see Figure 7.7) provided greater value for aquatic ecology.

In terms of aquatic ecology, the majority of survey sites (i.e. 1A, 1B, 2B, 2C, 3, 4A, 4C) were evaluated as being of local importance (lower value) based on evident seasonality, poor-quality and low species diversity.

Sites 2A, 4B and 5 retained water on a more persistent basis than other sites (i.e. containing water during mid-summer) and thus, were better quality aquatic habitats. Consequentially, these habitats were evaluated as being of local importance (higher value), with species such as Common Frog (*Rana temporaria*) being recorded. Common frogs are protected under the Irish Wildlife Act (1976, amended 2000) and are listed on Annex V of the EU 'Habitats Directive'. The evident permanence of water within these higher value drainage channels was reflected by the presence of Three-Spined Stickleback (*Gasterosteus aculeatus*), a widespread fish species in drainage channels.

The large attenuation pond (Site 6; offsite) provided the best aquatic habitat surveyed (local importance (higher value)), with Common Frog, Four-Spotted Chaser and Three-Spined Stickleback present, in addition to bird species (e.g. Reed Bunting, Sedge Warbler). The pond also supported dytiscid beetles, pond snails and cased caddis. However, the physiochemical water quality was poor overall, with moderately eutrophic conditions present, and this reduced the overall aquatic biodiversity value of the attenuation pond/wetland.

Both aquatic survey sites on the Ballinaclogh River (also known as Ballinacurra Creek; 7A and 7B) were of International importance given the sites were located within the Lower River Shannon SAC (002165). Furthermore, the tidal channel is known to support a range of transitional fish species including European eel (critically endangered; Pike et al., 2020), as well as Annex II Otter and the Flora (Protection) Order, 2015 plant species Triangular Club Rush and Opposite Leaved-Pondweed (see Figure 7.8 below).

The Ballynaclogh River, which bordered the site to the west, provided valuable habitat for a range of key aquatic ecological receptors such as fish (e.g., Flounder, European eel), macro-invertebrates, waterfowl and Annex II Otter. Whilst not recorded at survey sites 7A or 7B, the Flora (Protection) Order species Opposite-Leaved Pondweed (*Groenlandia densa*) is widespread along the Ballynaclogh River upstream and downstream of the study area (NPWS data, Figure 7.8). The FPO species Triangular Clubrush (*Schoenoplectus triqueter*) was present along Ballynaclogh River at both sites 7A and 7B, supporting the known distribution of the species along the channel (NPWS data, Figure 7.8).

The presence of Otter signs along the Ballynaclogh was recorded at site 7A (particularly underneath N18 road bridge on the west bank). This is consistent with the findings of the dedicated terrestrial ecology surveys. No Otter signs were recorded within the main development site, likely due to the low foraging value. Given the generally lower value aquatic habitats within the Greenpark site, otter potential is low with the exception of the wetland adjoining Ballynaclogh River.

No macro-invertebrate species of higher conservation concern than 'least concern' on National Red lists were recorded from the aquatic survey sites.

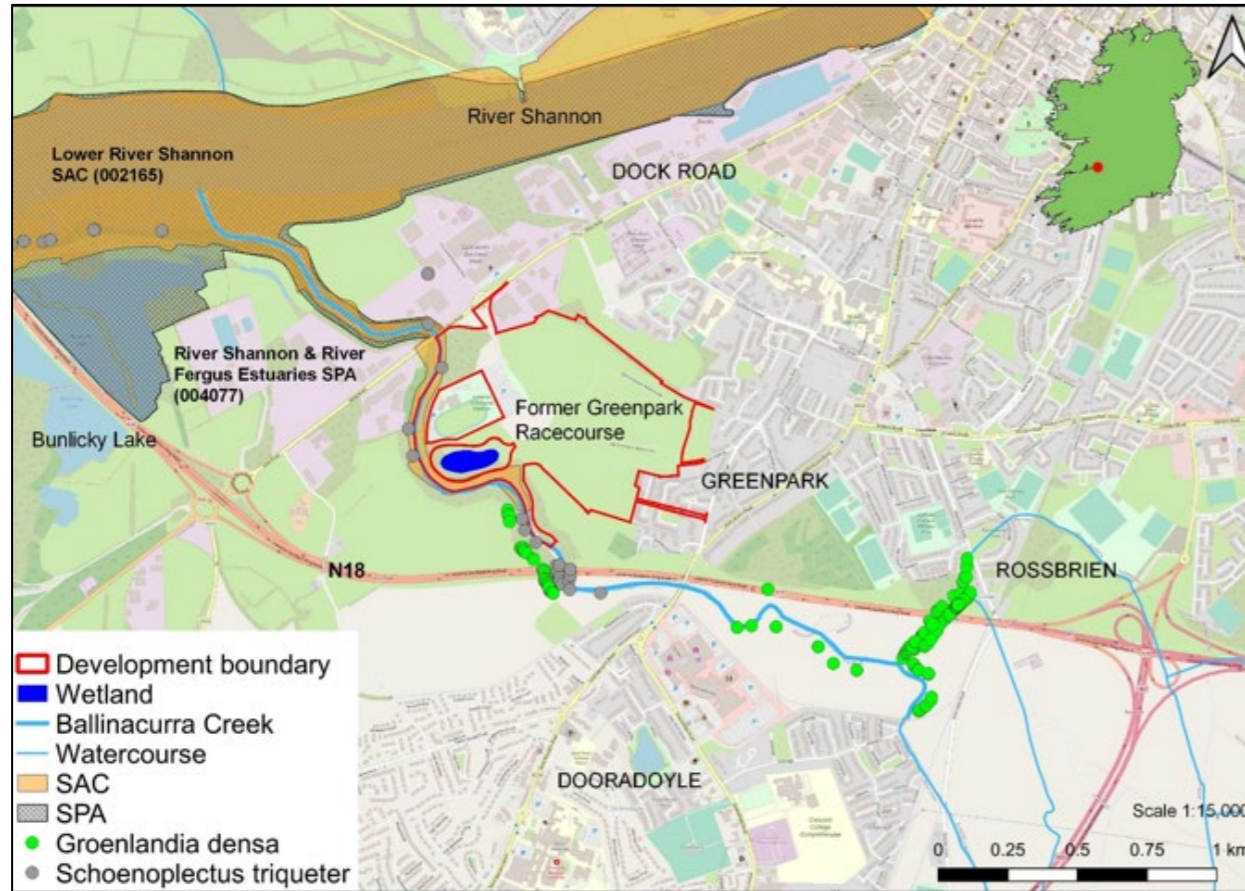


Figure 7.8: Locations of Opposite-Leaved Pondweed (*Groenlandia densa*) and Triangular Clubrush (*Schoenoplectus triqueter*) in vicinity of the study area (source: NPWS sensitive species data request).

7.5.3 Water Quality

A total of four physiochemical water samples were analysed as part of the survey, namely sites 1A, 5, 6 and 7B (Figure 7.7). In general, water quality was poor across all samples. Drainage channel sites 1A and 5, as well as the wetland at site 6 featured particularly low levels of dissolved oxygen which is detrimental to healthy aquatic life. Particularly high conductivity readings at sites 1A and 6 would indicate a source of contamination/pollution. The chlorophyll a level of site 6 (25.3µg/l) indicated the wetland site (offsite) was moderately eutrophic (according to OECD, 1982) and, therefore, the risk of deoxygenation and level of enrichment was considered higher than normal.

At site 7B, Ballynaclogh River achieved 'high status' ($\leq 0.030\text{mg P/l}$ at 0-17ppt salinity) under the Surface Water Regulations, S.I. No. 77/2019 according to Molybdate Reactive Phosphate levels. As a transitional waterbody, the river is considered as part of the Upper River Shannon Estuary for monitoring purposes and is currently achieving 'good' WFD status (2013-2018 period). In contrast, the Lower Shannon Estuary was achieving 'poor' WFD status and was considered 'at risk' of not meeting the WFD objectives (i.e. achieving good status, no deterioration of status).

There was no contemporary water quality data for the freshwater reaches of the Ballynaclogh River (upstream of the development site), with historical water quality data (prior to implementation of WFD) indicating 'poor' status Q3 water quality. The EPA River Waterbodies Risk for the Ballynaclogh River was 'under review' at the time of reporting.



Plate 7.5: Site 1A showing drainage channel with high levels of enrichment



Plate 7.6: Site 1B (a drainage channel with some limited tidal influences with tadpoles present)

7.6 Biodiversity Strategy

The masterplan area is located on the western outskirts of Limerick city, on lands that were formerly part of Limerick Race Course. The lands have been relatively unmanaged since the closure of the race course in 1999. The masterplan has outlined a strategy for the phased redevelopment of the lands to develop residential and commercial space in this area. Other sections of this masterplan have considered the drainage and future landscaping of the development and these strategies will be informed by the overarching biodiversity strategy.

A key feature of this site is the proximity to designated Natura 2000 sites, particularly the Lower River Shannon SAC and River Shannon & River Fergus Estuaries SPA. All future plans and projects within the masterplan area will be subject to the Appropriate Assessment process and given the proximity and hydrological connection to these sites it will be imperative that considerations relating to ecology and elimination of the risk of adverse impacts on sensitive species and habitats inform the detailed design and mitigation strategy.

Any project or plan will also necessitate the preparation of a detailed Construction and Environmental Management Plan (CEMP). This document will outline the measures that will be implemented to minimise any construction phase risks to the receiving environment, including the Lower River Shannon SAC (002165). The mitigation measures will be designed to address for instance the risk of hydrocarbon, sediment and construction pollutant release into surface waters (e.g. through construction best practice and careful consideration of surface and groundwater pathways) as a result of the proposed development, thereby eliminating the risk of significant negative effects on the aquatic ecology of the receiving environment.

The detailed design of elements of the project with the potential to impact on sensitive species in the wider environment will be informed by the project ecologists. For instance, the lighting design will be sensitive to the presence of birds and nocturnal mammals, including bats.

7.6.1 Principal Ecological Considerations – Construction Phase

The most important aquatic feature within or adjoining the site is the Ballynaclogh River and its riparian corridor associated with historical embankments. Approximately 0.7km of the embankment along the western development site boundary is located within the Lower River Shannon SAC (002165). There will be no direct impact to the water-dependent habitats and species listed as qualifying interest for the Lower River Shannon SAC, including Flora (Protection) Order 2015 plant species Opposite-Leaved Pondweed and Triangular Clubrush and Annex II otter, in addition to fish of conservation value (e.g. European eel).

The removal of internal drainage channels within the masterplan area, including seasonal channels to the north of the site, as part of the phased development could be off-set by the provision of wetland scrapes adjoining the proposed walkway loop along the western boundary of the site. These small habitat creation pools would accommodate breeding amphibians such as common frog which were recorded within the drainage channel network proposed to be removed.

The drainage channel feeding the attenuation pond (located directly adjacent to the masterplan area) from the south (Aquatic Ecology Survey site 5) will be widened to a two-stage channel, with proposed translocation of sedge and reed-swamp material from the existing drainage channel network within the site proposed for removal.

This would offset potential habitat and biodiversity loss as a result of development, particularly for amphibians and would also have nutrient sequestration benefits for storm water.

A primary objective would be to preserve the WFD Good Status water quality in the Upper Shannon Estuary by minimising nutrient and suspended solid loadings, in addition to other water pollutants. The wastewater proposals will ensure that there is sufficient capacity on the local connection network to accommodate the proposed phases of the development. In particular, the minimisation of nutrients and the prevention of pollutant spikes from storm drainage would be key design considerations.

Invasive Non-native Species have the potential to spread during construction works and impact on habitats including the nearby Lower River Shannon SAC which has habitat and hydrological connectivity to the proposed development. Invasive species have legal implications if left untreated, including Japanese Knotweed, Giant Hogweed, and Himalayan Balsam. They can spread rapidly over suitable habitat, including riverbanks, wetlands or disused waste land. Section 49 and 50 of Part 6 of the European Communities (Birds and Natural Habitats) Regulations 2011 restricts the dispersal, spread and transportation of these invasive species.

- A site assessment will be undertaken by a suitably qualified/experienced Ecologist prior to any construction, excavation, site clearance or landscaping works to assess the most up-to-date status of non-native invasive plants relative to the proposed development. Where invasive plant species are at/near the works/landscaping area, the relevant works will be managed in relation to invasive plants in line with current guidelines where available (e.g. NRA 2010; fencing off and erecting signage under the advice/supervision of a suitably qualified/experienced Ecologist with follow-up monitoring where appropriate).
 - a. The pre-construction ecological checks should include a check for the presence of breeding and resting places of protected mammals (including Otter) within or adjacent to the works area.

The CEMP which will accompany any future planning application will include measures to ensure that the potential risks to terrestrial and aquatic habitats and species are comprehensively addressed. Standard mitigation measures will include commitments such as:

- No removal of habitats or movement of construction machinery will occur outside of the development works area/footprint during the construction phase, where the works area/footprint will be clearly marked for associated site staff.
- No works will take place in or near the Lower River Shannon SAC. A setback distance will be established from the Lower River Shannon SAC boundary with the boundary clearly demarcated to avoid impact upon the designated site and its qualifying interests.
- All of the works and mitigation measures will be monitored by a suitably qualified ecologist during the construction period, with findings reported to the competent authority.
- A preliminary Landscape and Biodiversity Management Plan will be developed and will be finalised under the advice of a suitably qualified/experienced Ecologist that may also include the provision of habitats in addition to those proposed by the landscaping plan (e.g. pollinator friendly meadows and grassland, riparian zone planting along watercourses/water features) as well as monitoring/supervision of the management plan when implemented. Similarly, a series of biodiversity enhancement measures for terrestrial birds and mammals will be incorporated into the management plan. This would include the provision of roost and nest boxes for birds and bats.

- Existing hedgerows and trees to be retained at/near the site will be protected in line with current guidelines (e.g. NRA 2006).
- Woody vegetation clearance will be carried out outside of the bird breeding season and tree removal will be under the supervision of a suitably qualified ecologist.

7.6.2 Principle Ecological Considerations – Operational Phase

There will be an ongoing commitment to monitor the implementation of the ecological mitigation and enhancement measures. This will include follow up surveys to ensure the successful eradication of invasive plant species and the ongoing progress of the landscaping and biodiversity management measures at the site.

8.0 LANDSCAPE STRATEGY

8.1 Existing Landscape

8.1.1 Site Character and Context

The site is currently accessed from a roundabout on the Dock Road via the greyhound stadium access road. The stadium itself is a large presence to the west of the site due to a lack of screening. The adjacent landscape to the stadium is mainly bare ground with some colonising vegetation. The land to the west, adjacent to the river contains a large retention pond that has been colonised by reeds, no water is visible. The western portion of the lands are mainly overgrown colonising wet woodland, reed and wet grassland.



Elsewhere, there is less colonising vegetation, with larger areas of unmanaged open grassland where there are still traces of the racetrack visible. Smaller stands of immature trees are scattered throughout the eastern part of the lands. A dominating feature to the north is a row of over-mature Monterey Cypress that can be seen throughout the site.



View 1 – Access Road



View 2 – View to Dock Road



View 3 – Retention Pond Area – Colonised by reeds



View 4 – Log Na gCapall entrance point



View 5 – Greenpark Avenue entrance point



View 6 – View to North-West across open grassland areas



View 7 – View to east showing colonising vegetation typical site

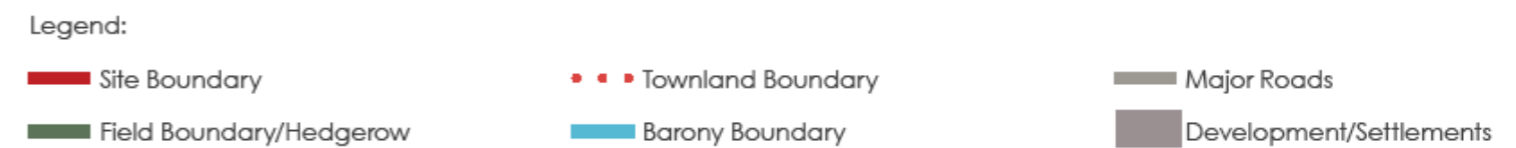
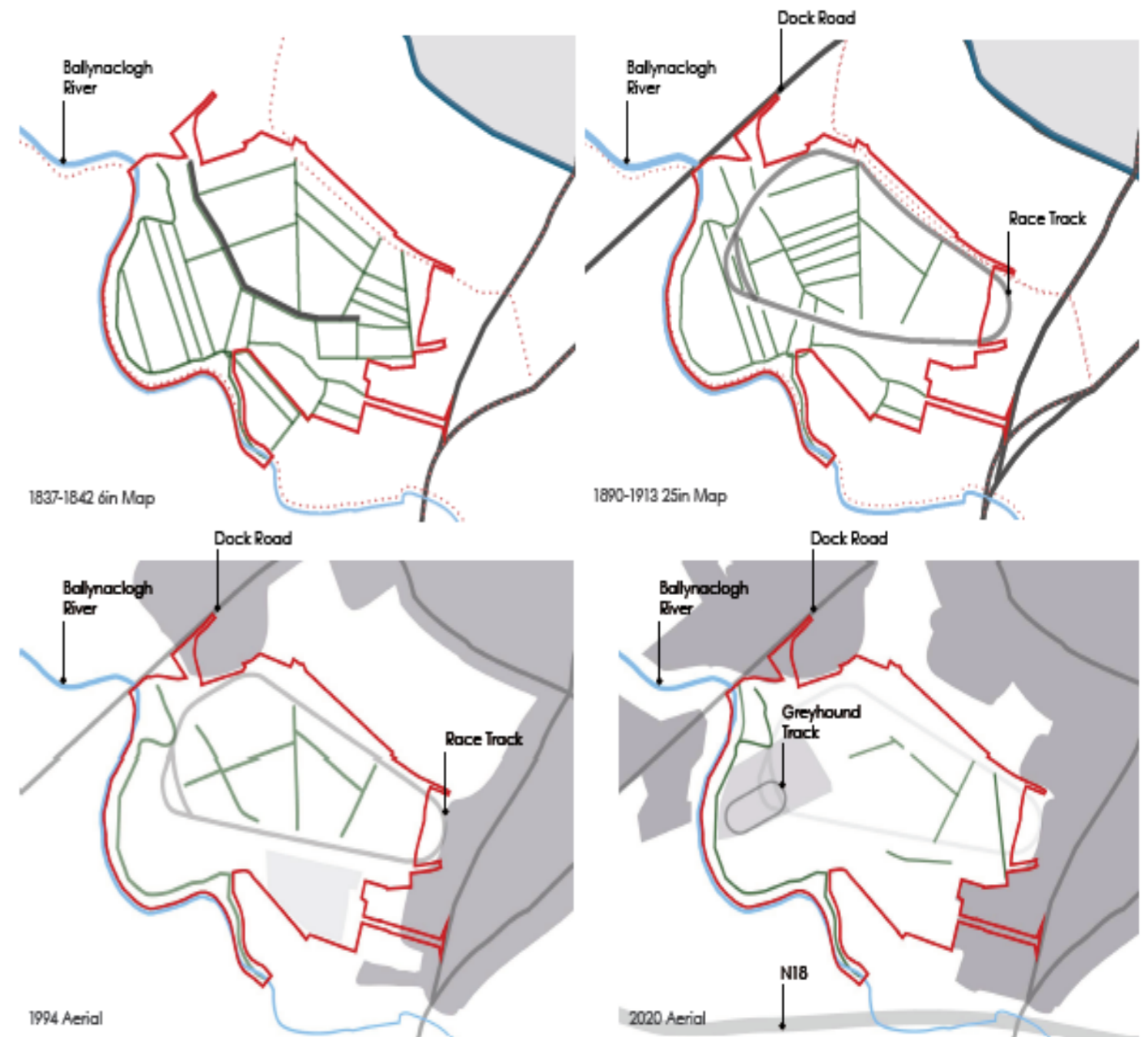
8.1.2 Existing Landscape

Historical mapping data from Ordnance Survey Ireland was accessed through the Geohive portal to assess the changes in landscape from an historical perspective. The earliest available mapping is the 6 inch maps of 1837- 1842. These show that the Masterplan lands are within the Ballinacurra townland and are entirely set out with an agricultural field pattern. There are ‘brick holes’ present along the river banks, which were relics of previous excavation for raw materials.

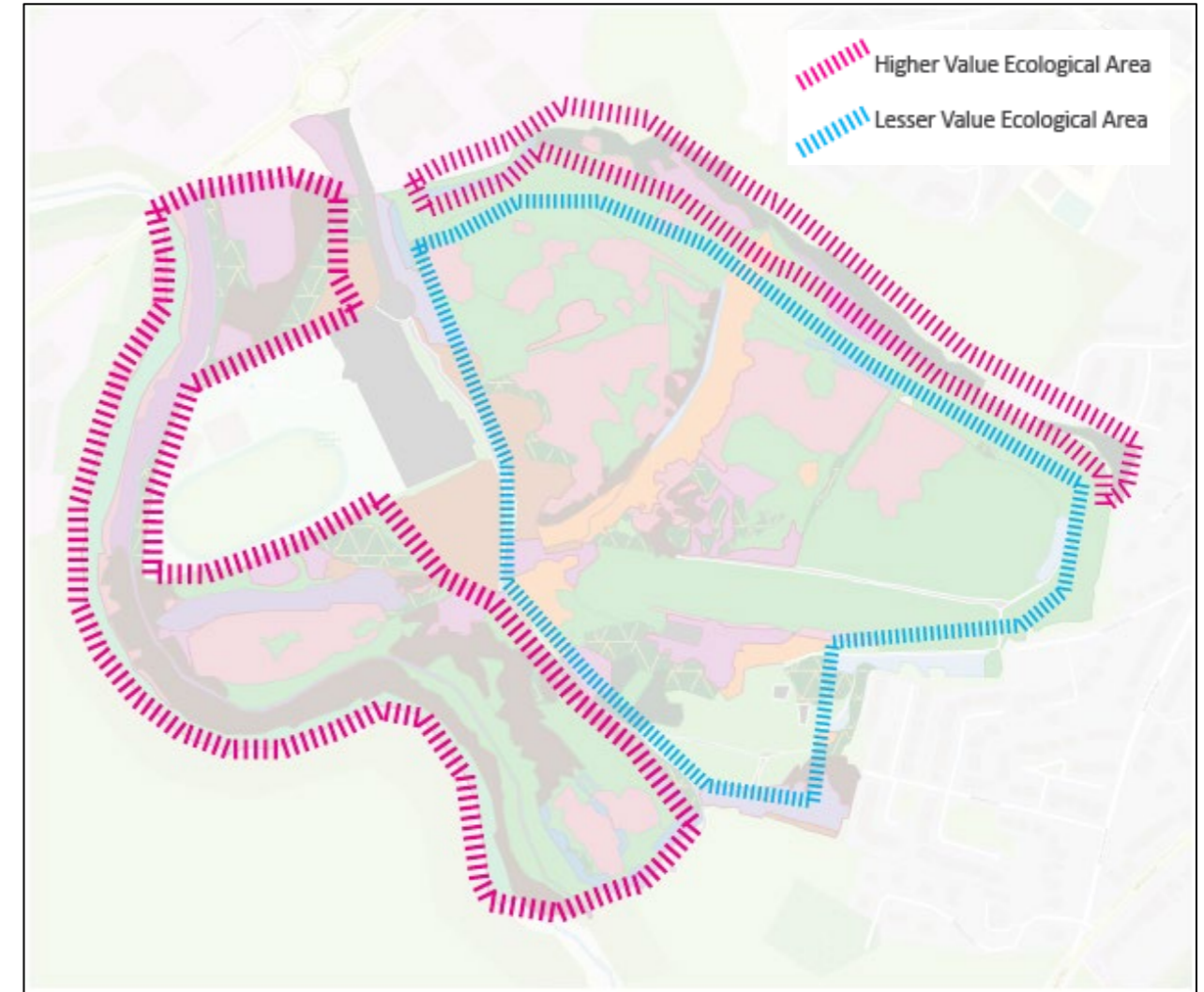
Moving to the 1890-1913 25 inch mapping, the racecourse is now present, with its associated grandstand. The previous field pattern is still readable, although somewhat diminished to the east. The greatest change is visible on the 1995 aerial imagery, with the racecourse still present and a large expansion of the grandstand area. Some field patterns are still discernible but many have largely disappeared, but the largest change is the encroachment of Limerick City is evident to the north and east.

Up to date aerial imagery shows the construction of the Greyhound Stadium and the N18 to the south. Small remnants remain of the field boundary/drainage system. The developed areas of commercial lands

to the north and residential lands to the east, are now almost at the Masterplan lands boundary. Overall, this sequence shows the diminishing field boundary system within the Masterplan lands and the gradual growth and encroachment on the lands of Limerick city.



8.1.3 Existing Vegetation and Habitat

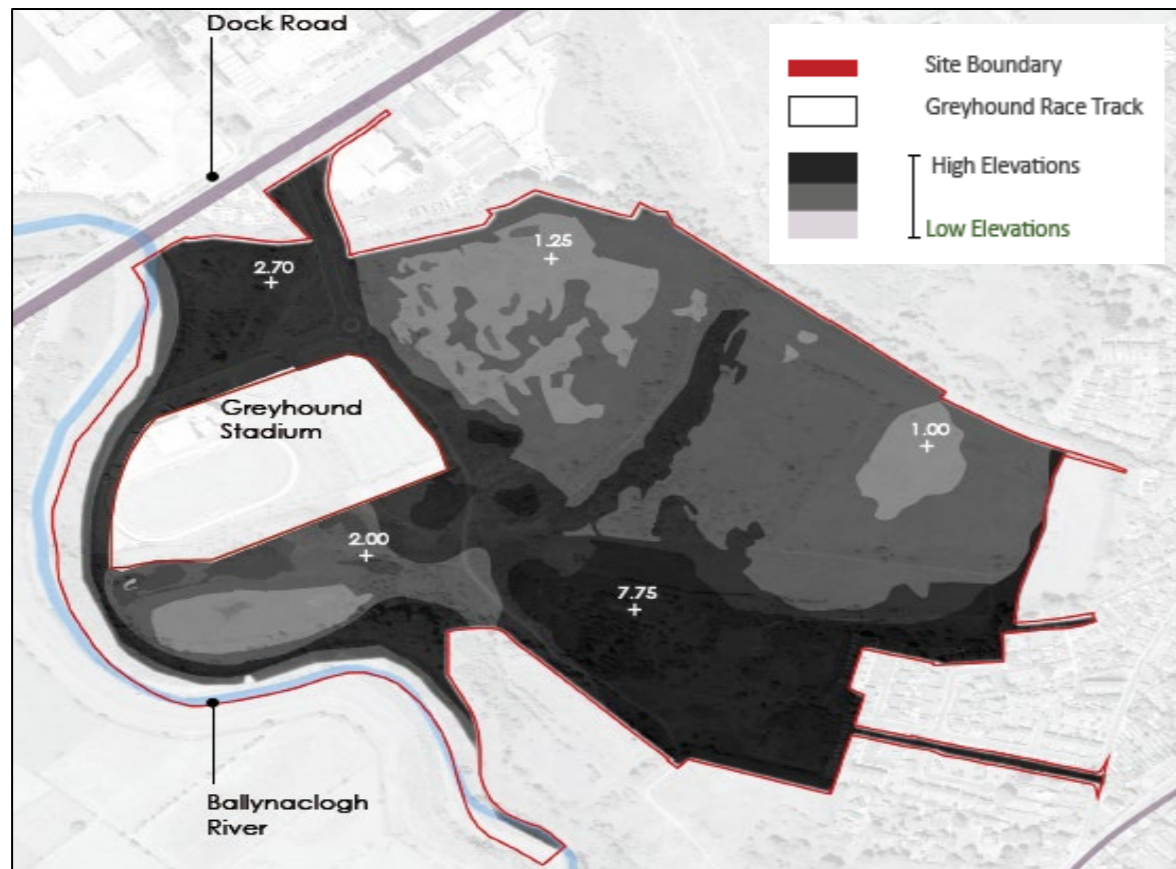
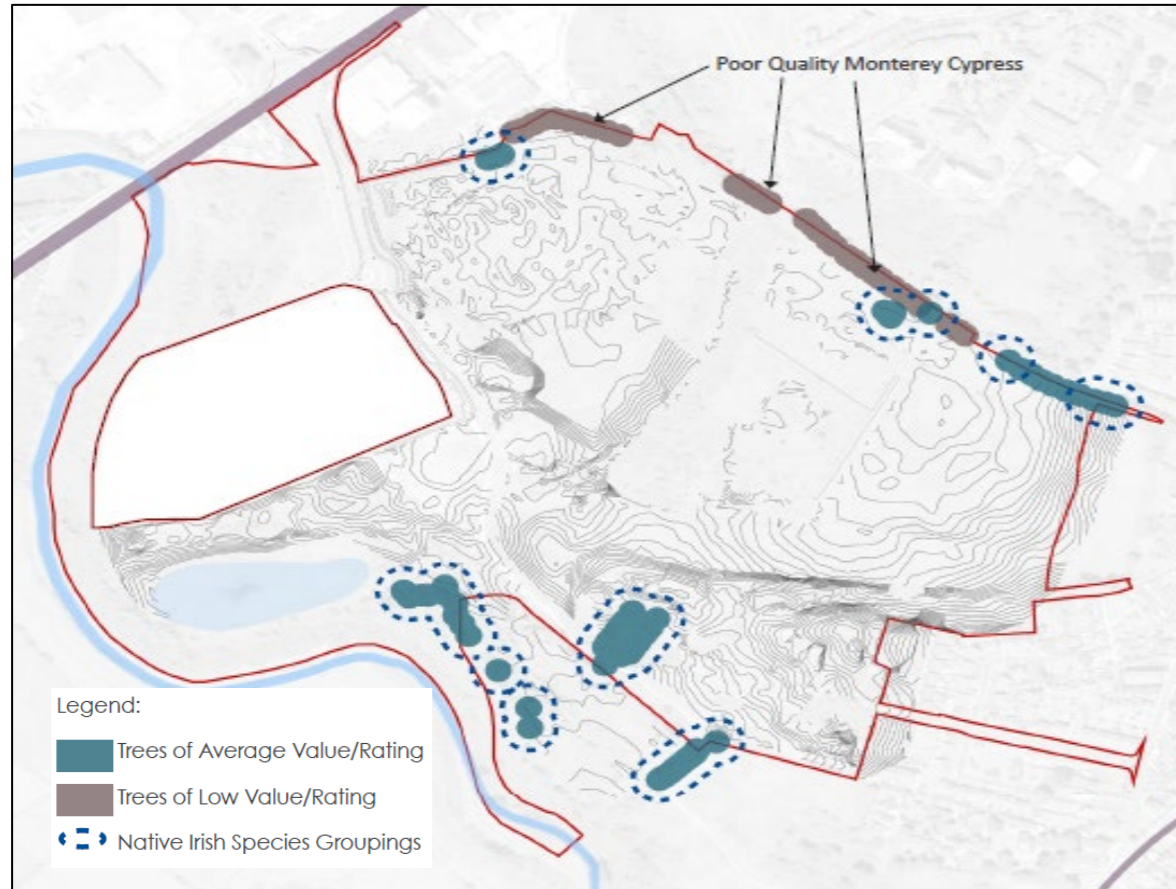


8.1.4 Existing Arboricultural Value

The existing trees within the Masterplan lands were surveyed by Arbor-Care at the end of September 2020. A total of sixty four individual trees and one hedgerow were surveyed.

There are few internal trees of note, with the majority of specimens along the northern boundary. These consist mainly of large over-mature Monterey Cypress, with a low retention value and of lesser ecological value. There are no Tree Protection Orders identified.

In summary, there are forty trees of good quality and twenty four of low quality. A high proportion of the Monterey Cypress trees are recommended for removal due to significant stem damage. Further information on species and condition can be found in Arbor-Care's Baseline Tree Survey Report and associated drawings.



8.1.5 Topography

The Masterplan lands are generally level in nature. The highest portion is to the south, adjacent to the existing residential areas and where the former racecourse grandstand was located. There is an earth embankment to the river that acts as a flood defence. The area designated as open space is mainly level with no large changes in gradients.

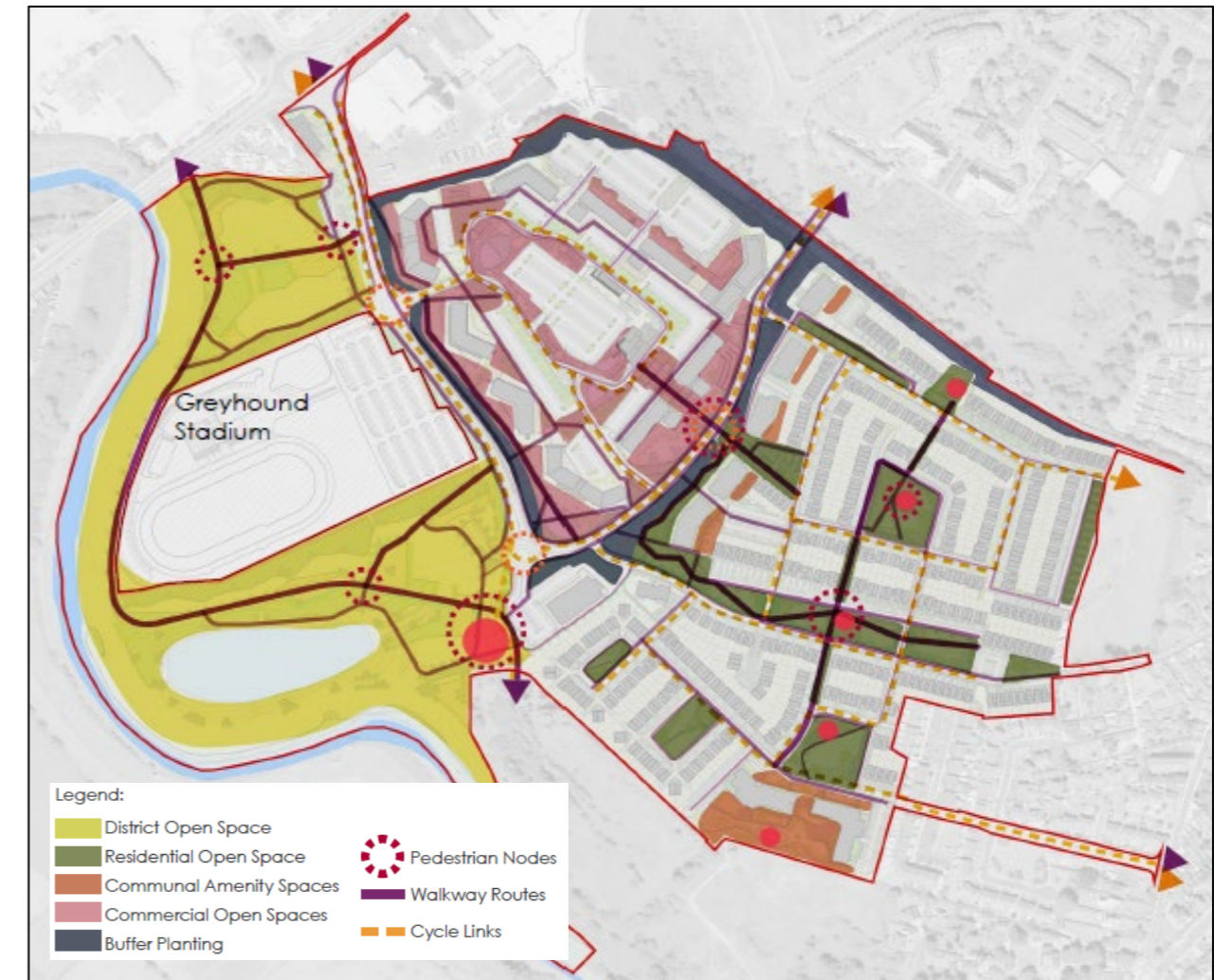
8.2 Landscape Strategy

8.2.1 Concept Overview

The overall landscape strategy has been developed by Murray and Associates in collaboration with the wider design team, including Tom Phillips & Associates, Lafferty Architects, Reddy Architecture and Urbanism, Ecology Ireland Wildlife Consultants, Punch Consulting Engineers, RPS Group and Arbor-Care.

There are three significant areas within the Masterplan:

- District Open Space
- Commercial Lands
- Residential Lands



The landscape strategy aims to create connectivity between these areas, on both pedestrian and green infrastructural levels. The realistic retention of existing vegetation and its associated biodiversity value is also an important factor. This has particular resonance within the district open space and areas adjacent to the Ballynaclogh River, with its Natura 2000 designations (SPA - Special Protection Area and SAC - Special Area of Conservation).

This district open space is for the residents, workers and visitors to the future developments within the Masterplan area. Also appraised are the potential linkages to the wider existing developed lands adjacent to the Greenpark area that would enable existing residents to easily access the open space.

The open spaces within the development context of both the residential and commercial areas have been considered in terms of pedestrian movement, connectivity and green infrastructure linkages. Similarly, the locations for play and passive recreation and communal amenity spaces are also considered. A variety and hierarchy of tree species and typologies within the various open space types within each development area are also outlined.

8.2.2 Guideline Design Approach and Open Space Planning Context

The design intent for any future applications should be to create a high quality and appropriate landscape for future residents, visitors and workers, which will meet their recreational needs and provide an attractive visual setting and associated social amenity spaces. The principles of inclusivity for all age groups, universal accessibility and sustainable development should be applied to ensure an inclusive and environmentally responsible design solution. The main objective of the landscape strategy for the Masterplan area is to place the new residential, commercial and community facilities within a cohesive landscape that responds to and integrates the proposed developments within the overall site.

The Masterplan strategy also seeks to create a permeable network of green infrastructure and open spaces across the Greenpark lands, throughout the commercial, residential and open space areas. This allows for the creation of a series of linked open spaces within easy walking distance of future residents, workers and visitors, along with a larger open space district park area zoned to the west of the lands and adjacent to the Ballynaclogh River.

Open spaces will cater for passive needs within the commercial area, while the residential area will include open spaces that cater for active and passive uses. The larger district park open space to the west will also cater for active and passive uses, while maintaining and enhancing the existing biodiversity of the area. Future landscape developments that are proposed should be in accordance with the relevant Green Infrastructure and Open Space policies of the Limerick City Development Plan (as amended) and the relevant national guidelines, as appropriate.

These include:

- *Building For Everyone - Booklet 1: External Environment and Approach*
- *Design Manual for Urban Streets and Roads (DMURS)*
- *National Cycle Manual (2011)*
- *Design Standards for New Apartments (2018)*
- *All-Ireland Pollinator Plan*
- *Sustainable Residential Development in Urban Areas (2009)*
- *Relevant Technical Guidance Documents (Part M)*

Future planning applications should take the above design guidelines as outline principles, and further develop them into a detailed design.



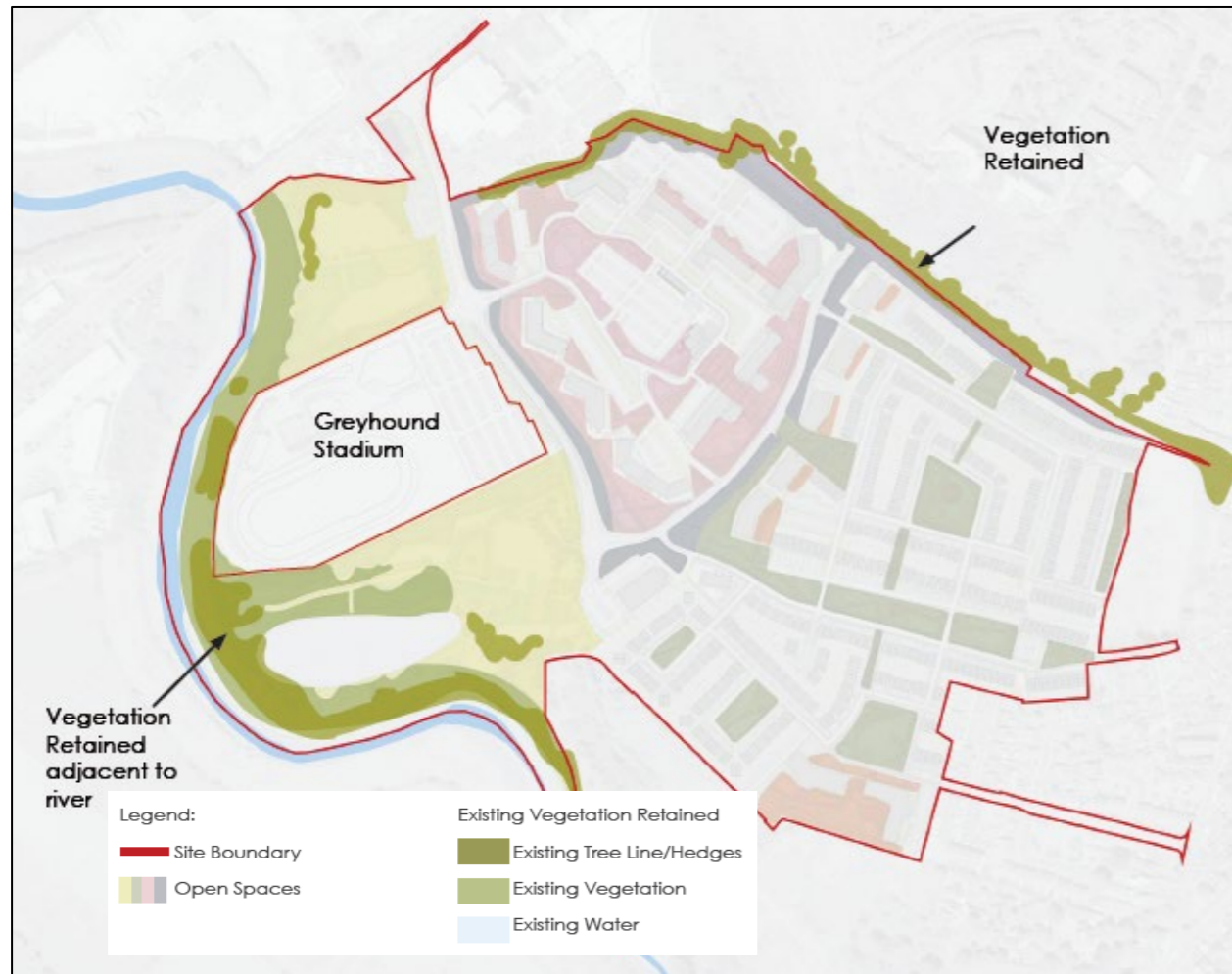
8.2.3 Vegetation Retention

The retention of existing vegetation has to be taken into consideration with constraints of the proposed development areas. There is more opportunity to retain existing habitats within the more expansive open space than within the developed areas of the commercial and residential zones. It is important to note that areas identified for retention are realistic and appropriate to the level of allowable development within the zoned lands.

The areas of highest biodiversity value are those approaching the Ballynaclogh River and its adjacent SPA and SAC areas. These are within the proposed district open space, therefore, there is more opportunity to retain existing vegetation and habitat in this area.

There is opportunity to enhance and extend the existing high-quality habitat and biodiversity values into the open space, allowing this to become a managed part of the open space network. This includes areas of wet grassland scrub, wet willow-alder-ash woodland and wet grassland.

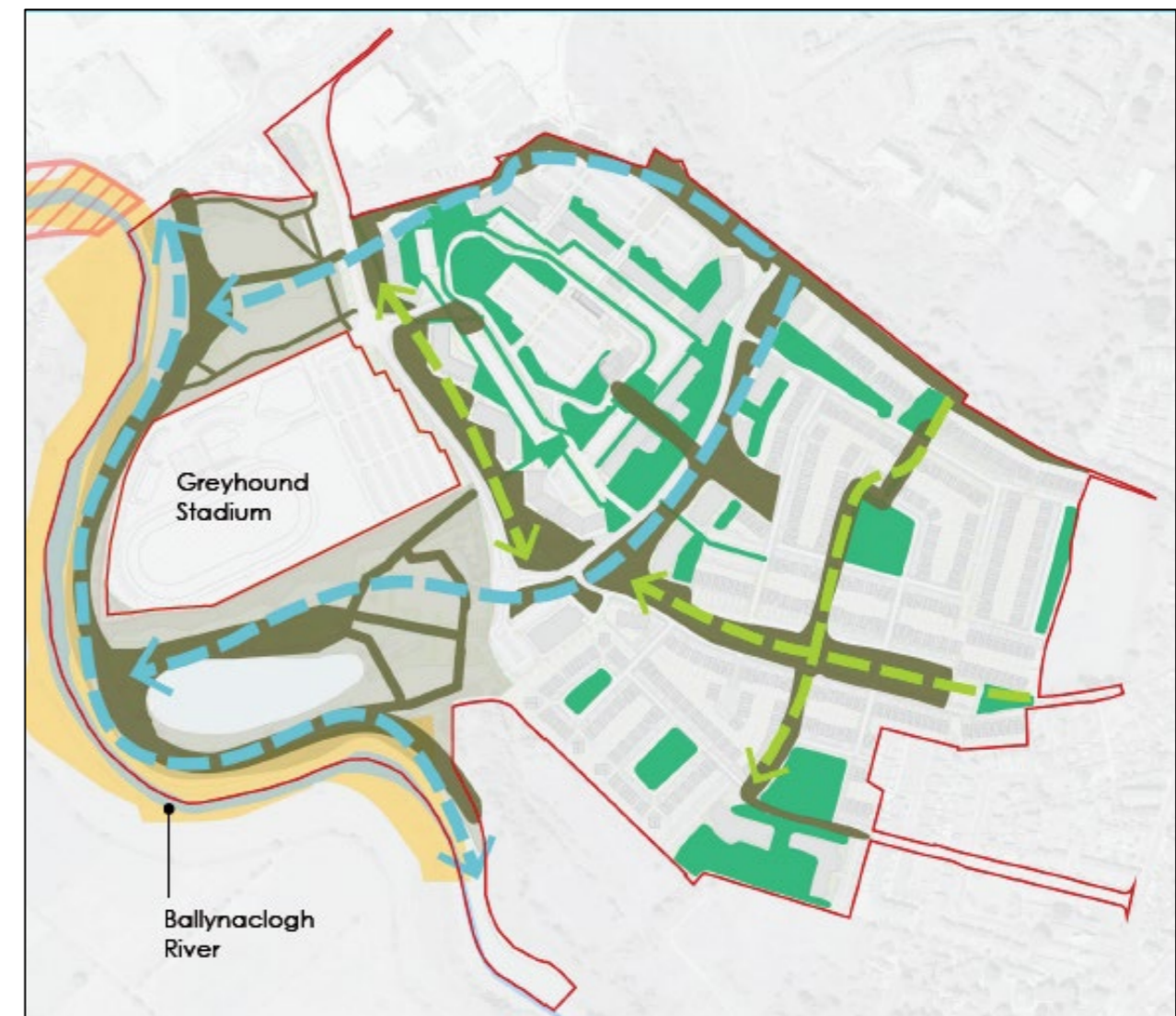
The existing vegetation to the northern boundary of the lands can also be retained in great part, dependant on the health and safety aspect of the existing trees, and their proximity to the proposed development areas. Although the trees are outside the ownership boundary, attention must be paid to their root protection areas to ensure any proposed development does not impact the trees.



- The connection through proposed developed areas of open spaces by proposing 'ecological corridors' that aid the movement of biodiversity and people;
- The inclusion of native tree and vegetation within any proposed planting scheme where possible

Within the proposed Masterplan area regard is given to the connection of open spaces and the use of native species throughout. This is achieved by allowing space for tree and shrub corridors within the development along roadways and within open spaces, giving a connected natural network throughout the proposed masterplan lands while also allowing linkages with future developments and existing green infrastructure networks.

On a local scale, SuDS elements and smaller green infrastructure corridors can be provided along the new urban street structure with the inclusion of trees, swale margins, filter strips and native planting.



8.2.4 Green Infrastructure

Future development at detailed design stage within the masterplan lands should have regard to the following key principles:

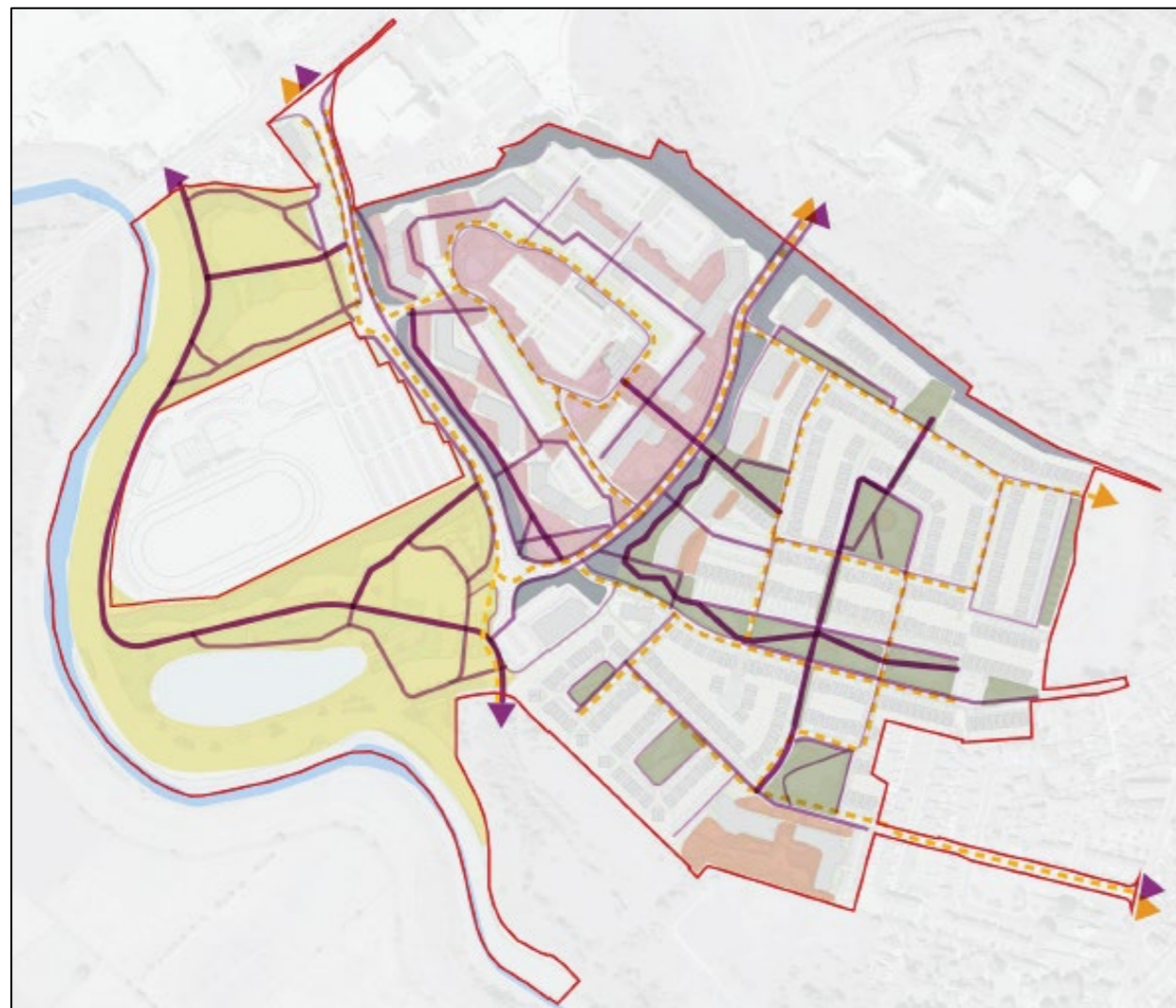
- The retention and enhancement of key landscape and ecological features within the existing landscape;
- Proposed new green infrastructure elements within any future application that may include:
 - tree planting;
 - an appropriate range of sustainable urban drainage systems (SuDS);
 - natural open spaces

8.2.5 Connectivity

Pedestrian permeability and connectivity throughout the Masterplan lands is an important element of creating liveable spaces. Clear, safe and accessible routes are a prime consideration and the design and implementation of all pedestrian paths and cycleways should adhere to the principles within relevant national design guidelines and the objectives within the current Limerick City Development Plan.

Important considerations include:

- The linkages between existing and future developments within the local area;
- Connectivity within the Masterplan lands that link the commercial, residential and open space lands;
- Legible pedestrian routes within each zoned area that provide safe and accessible paths, creating walking routes and connecting open spaces;
- A coherent hierarchy of pathways that aids wayfinding.



Legend:
 Site Boundary
 Open Spaces
 Cycle Links
 Amenity Walkway Routes
 External Pedestrian Connection
 External Cycle Connection

8.2.6 Play/Recreation Facilities

The play spaces and recreational elements within the Masterplan lands have been distributed to allow future residents, workers and visitors to enjoy easy and direct access to the various facilities. The play areas are envisaged, in part, as being 'Natural Play' areas with the inclusion of elements of formal play equipment as required.

The 'Ready, Steady, Play!' national play policy from the Department of Children, Equality, Disability, Integration and Youth (2019) should be consulted when detailed design of play spaces is considered. Opportunity also exists to provide guided exercise routes and outdoor gym equipment within all areas of the Masterplan.

Play and recreational facilities within the Masterplan lands are approximate and indicative only. Future play elements should be incorporated within developments in consultation with Limerick City and County Council at planning application stage, and account for varying types of play, age groups and an outline of where the proposed play fits into the wider local area.



Legend:
 Site Boundary
 Open Spaces
 Structure Play Area
 Natural Playful Area
 Fitness Station Points
 5 minute walk (400m) distance

Facilities to include:

- **Neighbourhood Equipped Area for Play (NEAP)** to be installed adjacent to the neighbourhood centre, to consist of natural play and formal play to cater for ages from 0-6 years and 6-12 years, within 15 minutes of residential areas;
- **Local Areas for Play (LAP)**, catering for children up to 6 years;
- **Local Equipped Areas for Play (LEAP)** within a five-minute walk of residential areas, some formal equipment within a 5-minute walk, equipped for early school age children.

a) **Natural Play Element**

Natural play incorporates a number of elements that enables play spaces to blend in with their natural surroundings, and encourages interaction with the natural landscape.

These components represent the larger wild environment in a way that feels safe and manageable to young visitors. A few man-made components might also be carefully integrated to support creative play, encourage confident exploration and help children to develop a lasting affinity for the natural world.

Enclosure:



Change in Topography:



Natural Materials:



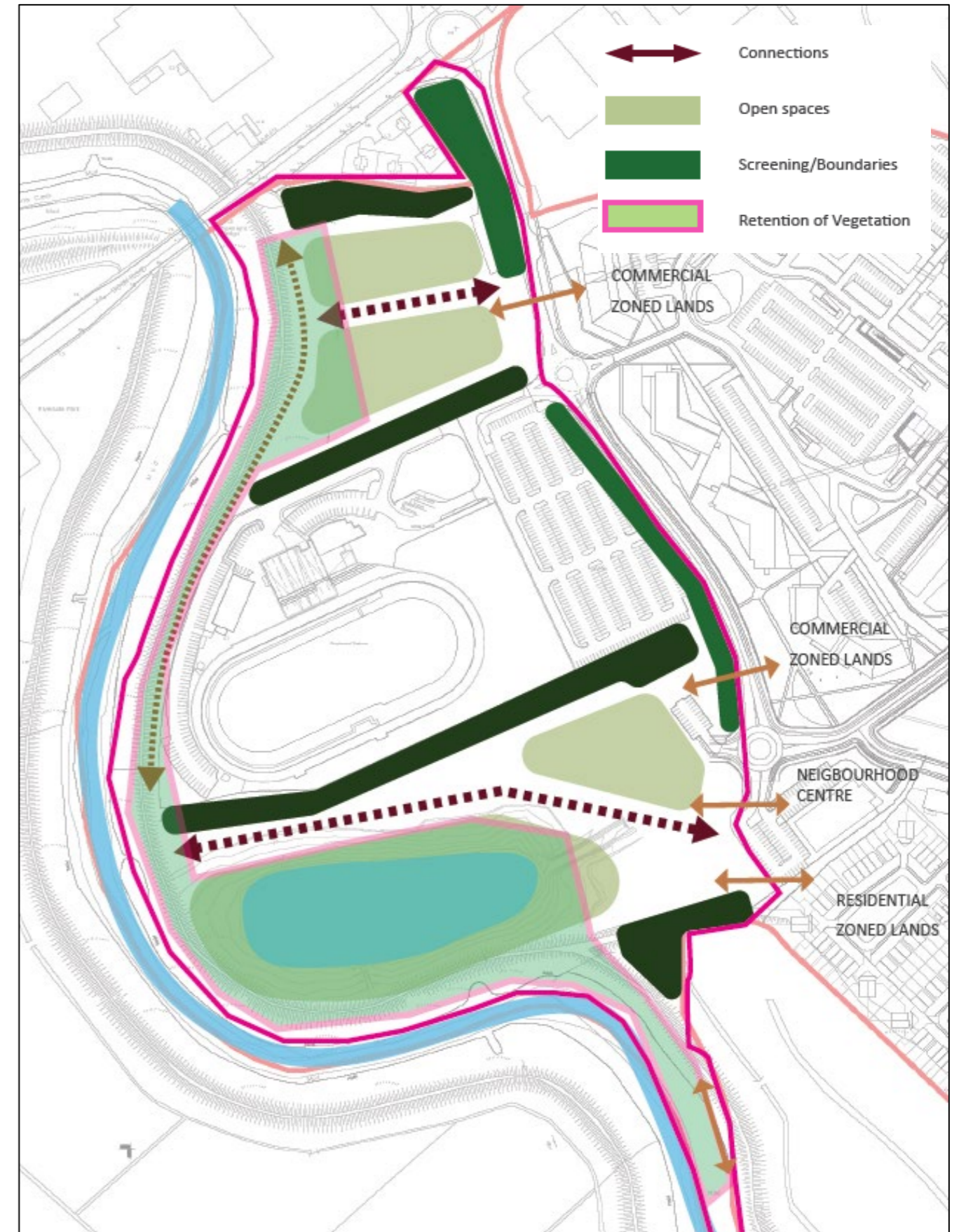
8.2.7 Guideline Design Principles – District Open Space

The following design principles should guide future detailed design of the open space. Note that play and recreational facilities are indicative only and should be decided in consultation with Limerick City and County Council.

- Existing vegetation to river edge to be retained, protected and reinforced;
- Greyhound Stadium to be screened with woodland planting;
- Additional native tree and wildflower planting to be proposed throughout open space;
- Create pedestrian/cycle links with future commercial and residential developments;
- Create grassed spaces for informal play and recreation;
- Create pedestrian routes through the open space to bring visitors into the spaces

Potential Additional Detailed Design Considerations:

- Signage installed to inform and connect visitors to existing and proposed biodiversity and native planting;
- Neighbourhood Equipped Area for Play (NEAP) to be installed adjacent to the neighbourhood centre, to consist of natural play and formal play and to cater for ages from 0-6 years and 6-12 years;
- Fitness and Heart-healthy exercise equipment to be installed in proposed fitness route;
- Informal seating spaces to be proposed throughout open space;
- Local SuDS measures to be introduced.



8.2.8 Indicative Design Layout – District Open Space



- 1 – Formal Seating along Urban Edge
- 2 – Wider Spine Paths with associated seating through Open Space
- 3 – Intimate seating areas adjacent to pathways
- 4 – Grassed open space areas for active and passive recreation
- 5 – Play Spaces: Natural playful spaces using level changes and natural materials
- 6 – Woodland Areas
- 7 – Link in with existing footpath to rear of greyhound stadium
- 8 – Area adjacent to river to be retained and enhanced with native planting
- 9 – Car parking
- 10 – Screening and Mounding to proposed roadway
- 11 – Existing Retention Pond

<ul style="list-style-type: none">  Grass Areas Passive Recreation Spaces for informal play, relaxation  Native Woodland Native Woodland Areas acting as screening to existing developments, Ecological Buffer, Green Infrastructure Corridor  Native Meadow/Biodiversity Areas Managed Native meadow species with mown paths, Ecological Buffer, Green Infrastructure Corridor  SuDS/Green Infrastructure Measures Native woodland/shrub, Swales, Filter Strips   Specimen Paving/Surfacing Areas Concrete Block Paving or specimen play surfacing to denote area of gathering/play space 	<ul style="list-style-type: none">  Pedestrian/Vehicular Spine Routes through Open Space - 5m width - Exposed Aggregate Concrete finish - joining Urban Edge with River  Secondary Pathways 2-3m width Self-Binding Gravel finish  Fitness Equipment: - Outdoor gym equipment as part of a running/fitness trail ncompassing entire open space  interpretive Signage: - Robust signage boards detailing Park's biodiversity & nature
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8.3 Open Space Zoning

8.3.1 General Aims and Objectives

a) Context and Place

The zoned open space is adjacent to the Ballynaclogh River and wraps around to the north and south of the existing greyhound stadium. A pedestrian route is provided linking the two open spaces between the river and the stadium.

Existing flood defenses consisting of a raised earth berm that lines the river. This berm cuts off visual and pedestrian access from the open space area to the river. There is an existing large attenuation pond in the southern portion of the lands that is linked into the river system.

b) Accessibility

Vehicular access is limited to a parking zone accessed from the roundabout adjacent to the proposed neighbourhood centre. Maintenance and emergency vehicles have access via the two larger central spine paths through both portions of open space.

A hierarchy of pathways is suggested. The two spine paths link the commercial and residential areas with the river edge, drawing pedestrians into the heart of the park and encouraging engagement with the landscape. A variety of smaller pedestrian routes are linked into the wider spine paths, creating circular walking routes throughout the open space.



Hierarchy of Pathways - from Urban to Rural



Hierarchy of Sustainable Drainage Systems - from Urban to Rural

c) Biodiversity

Existing vegetation is to be retained and managed where possible, particularly towards the river. Elsewhere, areas of native planting of local provenance should be used where possible. These are to include extensive native meadow areas, native woodland planting and areas of managed grass to facilitate passive recreation and play. Ornamental and pollinator-friendly plants can also be proposed in strategic locations.

SuDS measures are a key design influence on the open space and are present throughout the park. These are linked into the existing attenuation pond.

d) Design Ethos

The open space starts on the urban edge of the commercial and residential areas. This strong defined urban edge to the open space gradually gives way to a more natural, native setting, culminating in a wild edge adjacent to the river.

e) Typologies

Within the park there are a series of spaces linked by the wide central spine paths. These spaces provide a range of facilities appropriate to their setting and aspiring to the following precepts:

- Foster community spirit;
- Respond to the anticipated needs of the future community in an inclusive and accessible manner;
- Enhance habitat values and biodiversity;
- Create inviting, well-designed spaces that afford an opportunity to exercise, play and relax.

The landscape proposals may include the following indicative elements:

1. Formal Seating along Urban Edge
2. Wider Spine Paths with associated seating through Open Space
3. Intimate seating areas adjacent to pathways
4. Grassed open space areas for active & passive recreation
5. Outdoor Gym/Fitness Equipment on linked network throughout park
6. Play Spaces: Natural playful spaces using level changes and natural materials
7. Interpretive Signage: Detailing existing biodiversity and habitat for educational purposes



8.3.2 Guideline Design Principles – Commercial Area Open Space

The following design principles should guide future detailed design of the open spaces within the commercial zoned lands. Note that proposals are indicative only and should be decided in consultation with Limerick City and County Council.

- Screening measured to be applied to the proposed access road from Dock Road;
 - Use of grassed mounding and tree screening;
- Retention of existing trees to northern boundary;
- Enhancement of existing northern boundary with native tree and woodland species;
- Native trees to be used extensively throughout the lands where possible;
- Pedestrian links considered with Open Space to west and residential lands to south;
- Internal pedestrian routes and cycleways to be proposed;
- Extensive use of local SuDS measures throughout site.



8.3.3 Indicative Design Layout – Commercial Area Open Space



1. Main Urban Places
2. Secondary Intimate Plazas
3. Open Grassed Spaces
4. Legible Pedestrian Routes within Open Spaces and Commercial Plazas
5. Extensive Native Woodland Planting
6. Native Boundary Screening
7. Existing Tree line with enhanced Native Screening

8.4 Commercial Zoning Area

8.4.1 General Aims and Objectives

a) Context and Place

The commercial zoned area is situated to the east of the access road leading from Dock Road, in the northern portion of the Masterplan lands. The site is generally level and consists mainly of existing scrub and colonising vegetation. A row of existing trees is situated to the northern boundary of the lands.

b) Accessibility

Vehicular access is proposed to the greyhound stadium roundabout and the southern access road. Parking is proposed across the northern and central portions of the zoned area. Pedestrian access and circulation is promoted along the new Dock Road access boundary. Internal pedestrian and cycle circulation is also provided off-road between the proposed commercial units, while connections are incorporated to the proposed public open spaces to the west, and the new and existing residential areas to the south-east.

c) Biodiversity

Native planting of local provenance should be used where possible, in both intensive and extensive areas. Ornamental and pollinator-friendly plants can also be proposed in strategic locations.

d) Design Ethos

Site legibility is key within the public realm; the movement of people, the opportunity to stop, and the integration of sub-spaces to be read as a cohesive whole are guiding principles.

The external spaces are connected and permeable, although an implied hierarchy of open space is present over the site. This is delineated by scale, materials, planting typology and soft division of spaces, both visually, with planting, and within spaces by the hard landscape elements such as raised planting beds and grass mounding.

Future planning applications should take these design guidelines as outline principles, and further develop them into a detailed design.

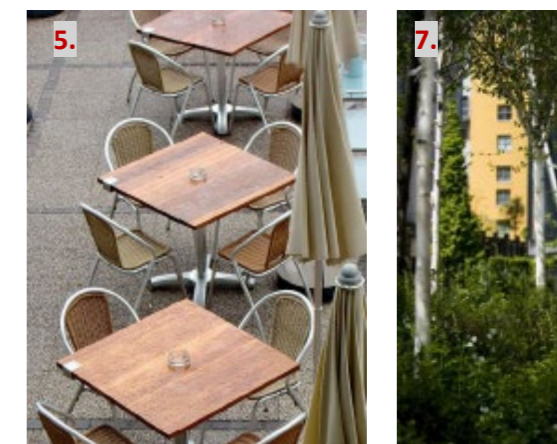
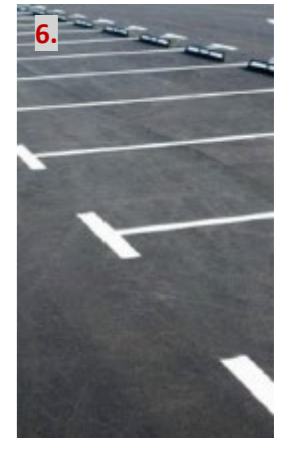
There are a range of intimate courtyards, larger plaza spaces and open spaces areas within the commercial zoned lands. They share certain characteristics such as: defining various spaces for contemplation or conversation, providing a sheltered microclimate for the comfort of visitors, providing interest through seasonal planting and judicious use of materials, and providing clearly defined spaces, routes and secure limits.

e) Typologies

There are a range of intimate courtyards, larger plaza spaces and open spaces areas within the commercial zoned lands. They share certain characteristics such as: defining various spaces for contemplation or conversation, providing a sheltered microclimate for the comfort of visitors, providing interest through seasonal planting and judicious use of materials, and providing clearly defined spaces, routes and secure limits.

The landscape proposals may include the following elements:

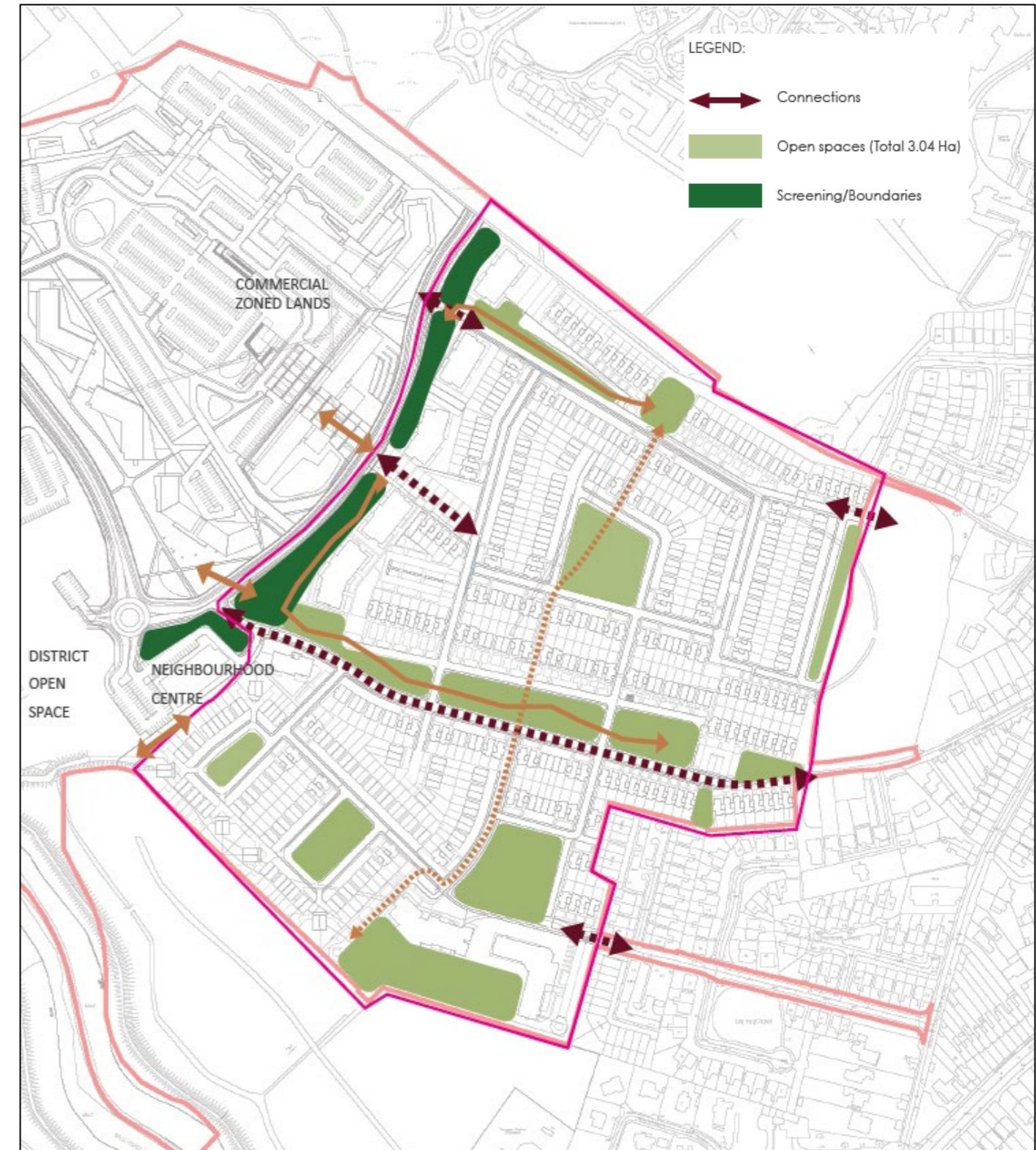
- 1 - Main Urban Plazas
- 2 - Secondary Intimate Plazas
- 3 - Open Grassed Spaces
- 4 - Legible Pedestrian Routes within Open Spaces and Commercial Plazas
- 5 - Intensively used open spaces
- 6 - Car Parking
- 7 - Native Boundary Screening



8.4.2 Guidelines Design Principles – Residential Area Open Space

The following design principles should guide future detailed design of the open spaces within the residential zoned lands. Note that play and recreational facilities are indicative only and should be decided in consultation with Limerick City and County Council at planning application stage.

- Pedestrian links to district open space and commercial zoned lands to be considered;
- Pedestrian links through development, connecting proposed opens spaces;
- Native planting proposed where possible;
- Regard to All-Ireland Pollinator Plan where native planting is not proposed;
- Hierarchy of tree planting to reflect street typology;
- Screening measures to main link road;
- Play areas to be considered through larger open spaces:
 - to include Local Areas for Play (LAP) and Local Equipped Areas for Play (LEAP) within a five minute walk.





- 1 - Main Open Space with native tree planting
- 2 - Pocket Park with natural playful spaces
- 3 - Homezones
- 4 - Play areas for all ages within each larger open space
- 5 - Screening & Mounding to Roadway
- 6 - Semi-Private Amenity Space

8.5 Residential Zoning Area

8.5.1 Aim and Objectives

The site layout proposals aim to create a unifying streetscape which is rich in detail and diverse in textural and spatial qualities, with open spaces and boundary planting lending a verdant and visually attractive atmosphere. The open spaces are directly over-looked by dwellings, providing passive surveillance for safety. All pedestrian routes and access points are fully accessible and inclusive.

Within the open spaces there are areas for informal play, casual recreation and passive leisure. The quality of these spaces is enhanced by the inclusion of features such as seating, paths, native planting and landform. A sympathetic palette of materials will also be used to integrate the proposed architectural forms and materials within the landscape.

Within the Masterplan's residentially zoned lands there are 8 no. open spaces in total, which accounts for c. 16% of the total residential area within the Masterplan.

This mosaic of open spaces gives every resident easy and convenient access to recreational amenity, and allows distinct landscape treatments and elements to be applied to different spaces. This aids way-finding and contributes towards giving the development a recognisable character.

Natural Play elements will be incorporated within the open spaces. Natural Play incorporates designed elements that enable play spaces to blend in with their surroundings and encouraging interaction with the natural landscape. Local Areas for Play (LAP) and Local Equipped Areas for Play (LEAP) will be incorporated within a five minute walk of the residential developments. A larger Neighbourhood Equipped Area for Play (NEAP) is included in the zoned open space element of the masterplan lands.

All appropriate age ranges will be catered for and play spaces will be fully accessible, inclusive and comply with the relevant safety standards.

All landscape elements within any future planning applications should have regard for development standards within the Limerick City Development Plan and the relevant national guidelines as appropriate.

a) Typologies

There are a range of open space sizes within the site. Larger central open spaces cater for passive play and recreation, while smaller pocket parks provide more local intimate spaces for play and relaxation. Semi-mature trees are planted along the streets where possible and native planting is included within the open spaces. The landscape proposals may include the following elements:

- 1 - Main Open Space with native tree planting
- 2 - Pocket Park with natural playful spaces
- 3 - Homezones
- 4 - Ornamental planting at pedestrian nodes
- 5 - Play areas for all ages within each larger open space
- 6 - Age-friendly seating areas within open spaces
- 7 - Tree-lined streetscape with incidental seating
- 8 - Soft division of on-curtilage parking where possible



8.5.2 Tree Planting Typologies

The intention should be to plant native species where possible. If non-native species are proposed, regard should be had to the All Ireland Pollinator Plan. All trees listed are suggested/typical species, and may be added to with appropriate species/ varieties. Sizes are indicative and describe a hierarchy appropriate to setting and location.

a) Residential Landscape

Open Spaces: 12-14cm - 16-18cm girth

- *Quercus robur*, *Sorbus aucuparia*, *Pinus sylvestris*, *Sorbus aria*, *Salix spp*, *Alnus glutinosa*, *Betula pendula*

Link Roads: 16-18cm - 20-25cm girth

- *Carpinus betulus*, *Tilia cordata* 'Greenspire', *Platanus orientalis* 'Minaret'

Local Roads: 14-16cm - 16-18cm girth

- *Alnus glutinosa*, *Betula pubescens*, *Sorbus aucuparia*

Small Residential Streets/Homezones: 12-14cm - 14-16cm girth

- *Corylus avellana*, *Prunus avium*, *Pyrus* 'Chanticleer', *Malus sylvestris*, *Betula pendula*

b) Commercial Landscape

Screening/Boundaries: Bare-root to 16-18cm girth

- *Pinus sylvestris*, *Alnus glutinosa*, *Quercus robur*, *Prunusn avium*, *Prunus padus*, *Corylus aellana*, *Salix spp.*,

Extensive Open Spaces: 14-16cm girth

- *Betula pendula*, *Sorbus aria*, *Sorbus aucuparia*, *Prunus avium*, *Crataegus spp.*, *Malus spp.*,

Roads: 16-18cm girth

- *Carpinus betulus*, *Pyrus* 'Chanticleer'

Pathways/Plaza Spaces: 12-14 - 14-16cm girth

- *Amelanchier spp.*, *Betula spp.*, *Carpinus betulus*, *Ornamental flowering species as per All Ireland Pollinator Plan*

c) District Open Space

Native Extensive Areas: bare-root, transplants, 10-12cm girth

- *Betula pubescens*, *Betula nigra*, *Alnus glutinosa*, *Prunus spinosa*, *Malus sylvestris*, *Crateagus monogyna*, *Corylus avellana*, *Salix spp.*, *Pinus sylvestris*, *Quercus spp.*,

Woodland Areas: bare-root, transplants, 10-12cm girth

- *Alnus glutinosa*, *Betula pendula*, *Betula pubescens*, *Crataegus*, *Malus sylvestris*, *Quercus robur*, *Prunus avium*, *Acer campestre*.

Parkland Trees: 12-14cm - 14-16cm girth

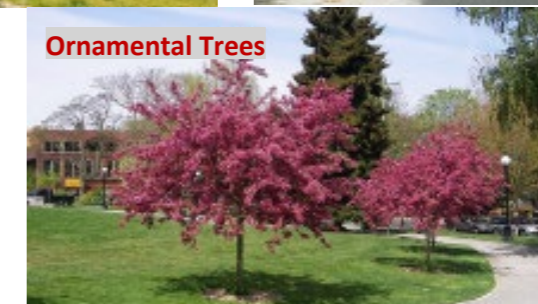
- *Sorbus aria*, *Sorbus aucuparia*, *Alnus glutinosa*, *Fagus sylvatica*, *Aesculus spp.*, *Quercus robur*, *Prunus spp.*, *Castanea sativa*, *Betula spp.*

Urban Edge: 16-18 - 20-25cm girth

- *Acer campestre* 'Elegant', *Tilia cordata*



Residential Landscape	Commercial Landscape	District Open Space
Open Spaces	Screening/Boundaries	Native Extensive Areas
Link Roads	Extensive Open Spaces	Woodland Areas
Local Roads	Pathways/Plaza Spaces	Parkland Trees:
Small Residential Streets/Homezones		Urban Edge

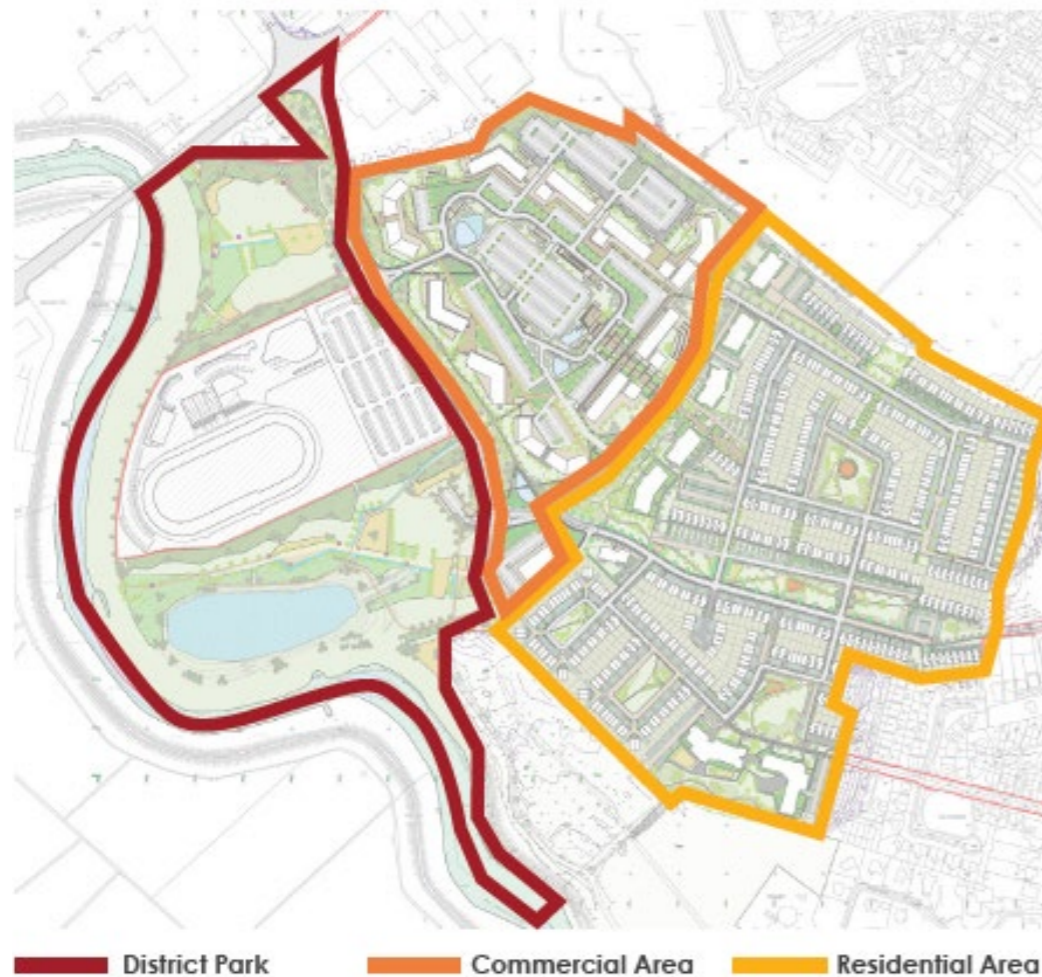


8.5.3 Soft Landscape

In selecting plant material, a core criterion is that species should not require irrigating. In addition to species selection, irrigation should be avoided for trees by ensuring tree planting pits have generous volumes of good quality free draining topsoil. In order to minimise the need for mowing, extensive lawn areas are to be avoided where possible; meadow areas or wilder, natural open space areas should be included in their place. Where mown areas are required they should cater for informal sports and events.

Native trees and shrub species should be predominantly used throughout the masterplan areas where possible, and suited to the micro-climactic conditions. Where native species are not proposed, planting should have reference to the All-Ireland Pollinator Plan. Within the commercial and residential open spaces, native species should also be mainly used. However, ornamental shrubs, perennials and hedging can be proposed adjacent to seating areas and entrances to add interest in these intensively used spaces. This intensification of planting can also be proposed around other thresholds and pedestrian nodes, and can aid wayfinding. These public realm planting mixes are to be selected for vigour and once established should require minimal maintenance.

In contrast, the proposed District Park should have a more expansive, natural and permeable nature, with larger areas of appropriate native meadow and native woodland. Larger groups of tree planting should be considered, that link in with the existing biodiversity on site, creating new and enhancing the existing green infrastructure networks. An intensification of planting can be proposed at appropriate locations within the district open space: play areas, seating spaces and path intersections.



Field Maple
(*Acer campestre*)



Elm 'Lobel'
(*Ulmus 'Lobel'*)



Hawthorn
(*Crataegus spp.*)



Blackthorn
(*Prunus spinosa*)



Small Leaved Lime
(*Tilia cordata*)



Scots pine
(*Pinus sylvestris*)



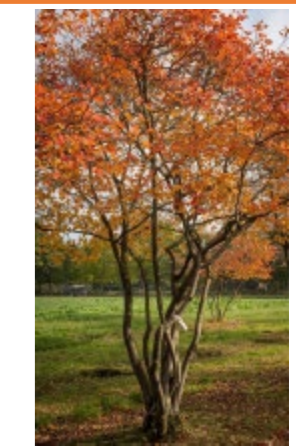
Silver Birch
(*Betula pendula*)



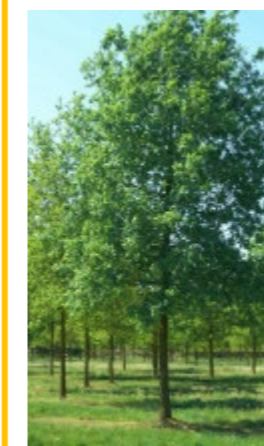
Callery pear 'Chanticleer'
(*Pyrus 'Chanticleer'*)



Crab apple
(*Malus spp.*)



Snowy Mespilus
(*Amelanchier lamarckii*)



Common Oak
(*Quercus robur*)



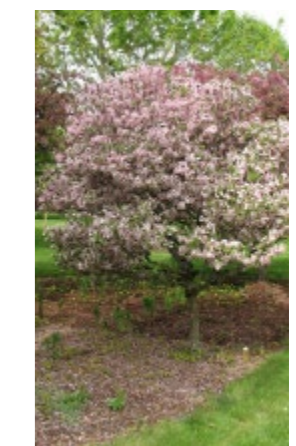
Oriental Plane
(*Platanus orientalis 'Minaret'*)



Common Alder
(*Alnus glutinosa*)



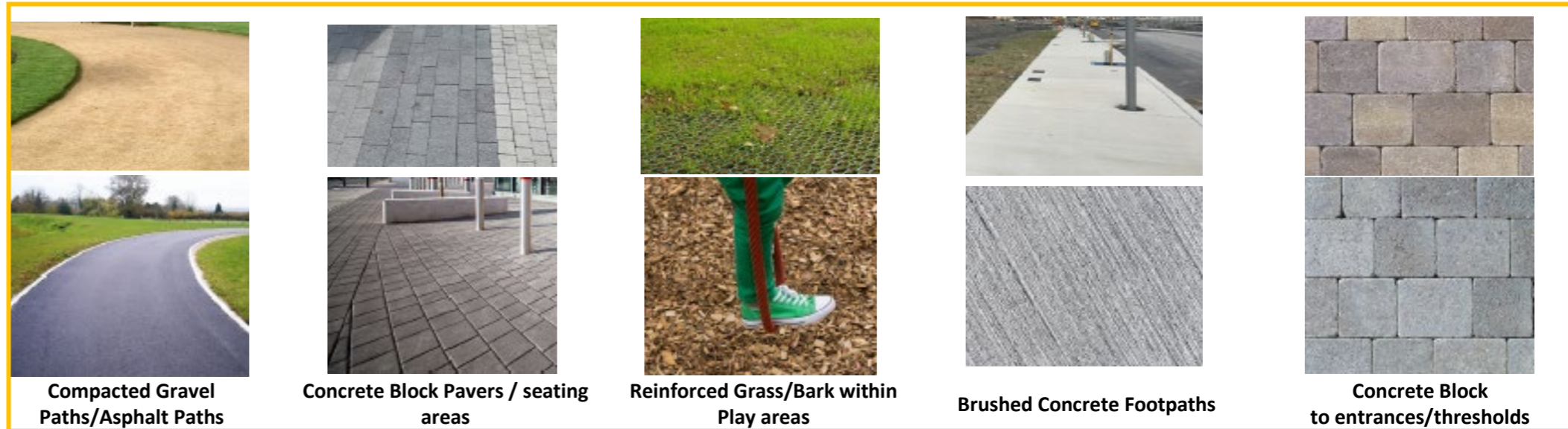
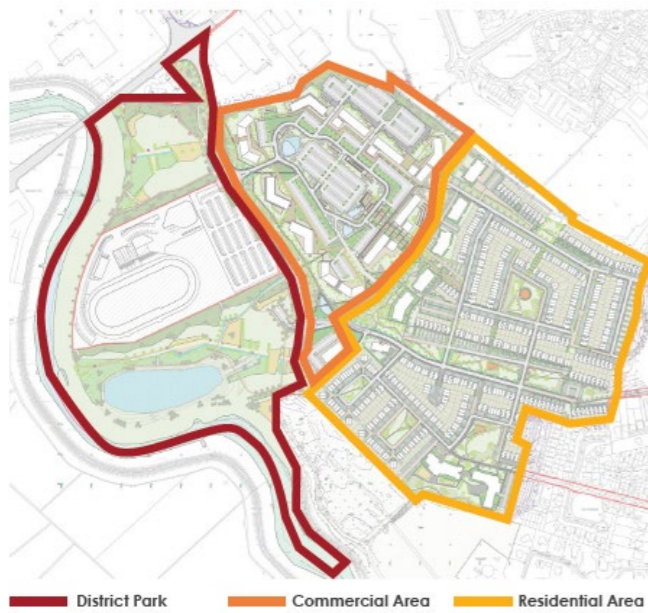
Hazel
(*Corylus avellana*)



Crab Apple
(*Malus sylvestris*)

(a) Surface Materials

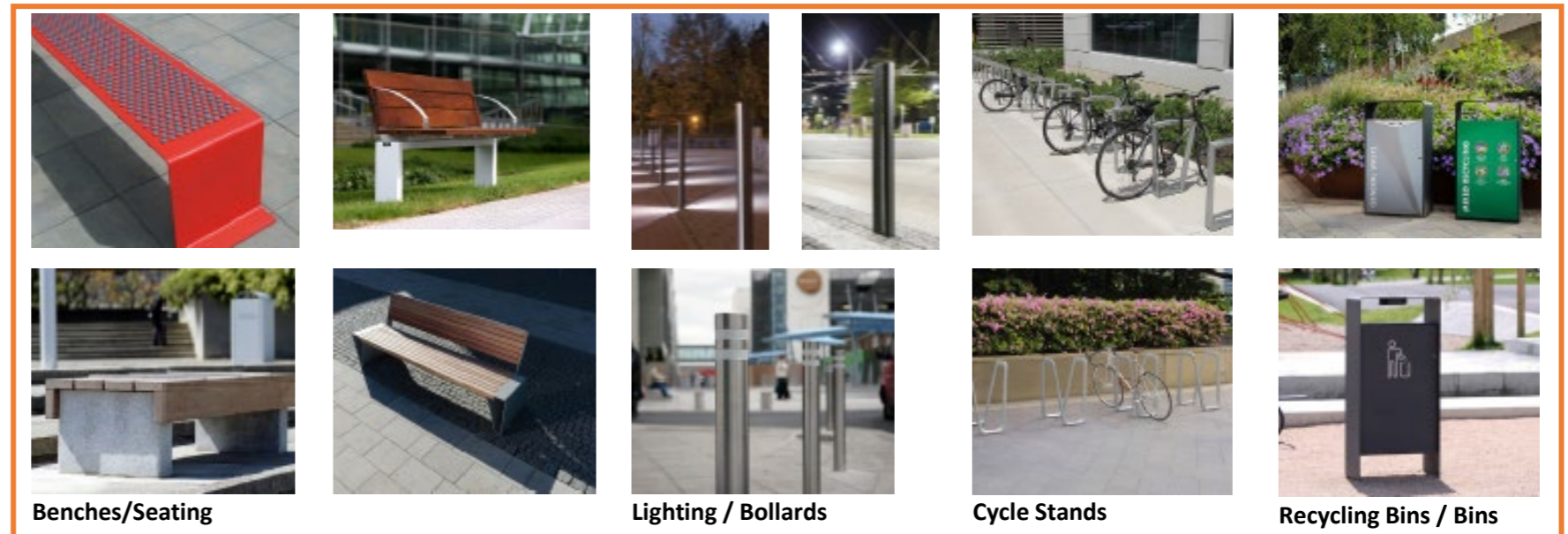
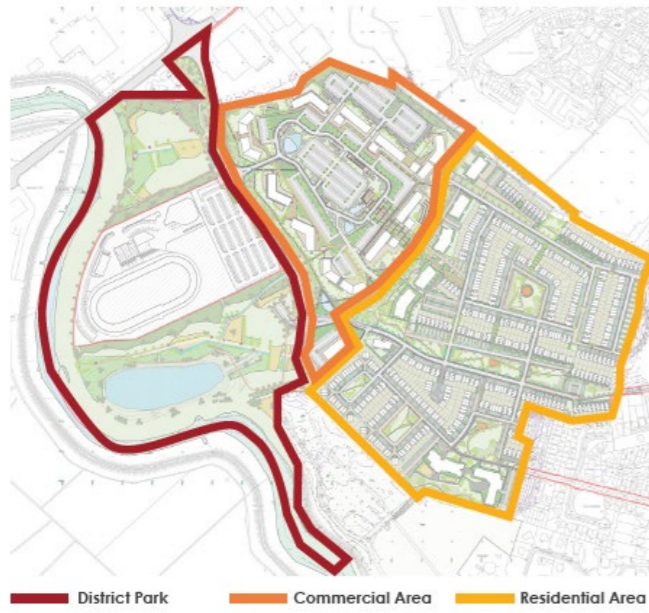
A simple and robust palette of hard landscape materials is proposed and should be chosen for their slip resistance, simplicity, and to facilitate drainage and water collection.



a) Furniture

Indicative palette of furniture:

- Benches/Seating
- Picnic Table
- Lighting
- Bollards
- Cycle Stands
- Bins



b) Maintenance Strategy

Maintenance and management of the landscape within the masterplan lands is an important factor in terms of time, impact on biodiversity and costly resources.

There will be areas that require a regular regime; play spaces, urban edges, ornamental planting within the commercial/residential spaces. The management of these spaces should be fully addressed within any future planning application. This can be done by way of a management and maintenance strategy that outlines the various areas and their maintenance requirements.

However, the overarching strategy where possible, should be one of allowing a softer, less controlled landscape. To this end, particularly within the District Open Space, a maintenance regime that allows wilder, less managed spaces to emerge can be proposed. This ties in with the retention and enhancement of the existing vegetation to the west of the open space, and its associated biodiversity value.

This 'light' maintenance regime allows the existing and proposed native areas to develop and become an important tool for education and health. Opportunities within the landscape to proposed less maintenance-heavy regimes include:

- Areas of woodland;
- Wildflower meadows;
- Areas of long grass and bulbs, within lawn areas;
- The retention of existing vegetation on site;
- Areas of native biodiversity, allowing lands to emerge on their own with minimal intervention.



Areas where a 'light' maintenance strategy can be implemented.



Verges within open spaces can be areas of high biodiversity.



Managed grass meadows of native species.

c) Ecological Mitigation Measures

There are opportunities throughout the Masterplan lands to install simple elements that contribute towards increasing the biodiversity value of all areas. The light maintenance regime also contributes towards an increase in biodiversity.

Additional Measures include:

- **Bird Boxes** - Provision of bird nesting opportunities through the installation of bird boxes/bird bricks.
- **Bat Boxes** - The provision of bat boxes in collaboration with ecology consultants.
- **Invertebrate Boxes** – The installation of Invertebrate boxes on the site should be proposed. These nesting aids should be installed in sunny locations, protected from the wind and rain by adjacent trees or shrubs, which should help ensure sufficient shelter.



Areas of extensive open space.

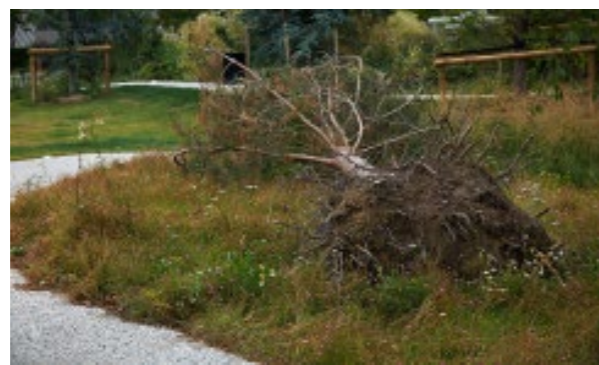


Invertebrate boxes.



A variety of bird boxes cater for varying species.

Bird boxes where trees are immature.



Managed areas contributing to insect biodiversity.



Bat boxes.



Bird Boxes.

9.0 MASTERPLAN AND DESIGN PRINCIPLES

9.1 Vision and Principles

The vision for the Masterplan seeks to rejuvenate and regenerate this large brownfield site and significant urban land bank, which is located within close proximity to Limerick City.

The Masterplan proposes a legible mixed use development centred on a series of connected streets, pocket parks and public open space, comprising a range of uses to promote Live-Work-Play development with many of the facilities required by a new community provided within easy walking distance

9.2 Roles and Responsibilities

An experienced team has been assembled to design this varied and dynamic Masterplan vision:

a) Overall Design & Masterplan

Lafferty Architects and Masterplanners are responsible for the co-ordination of design and strategy for the Greenpark Masterplan encompassing a multi-phased residential development and office campus, neighbourhood centre, crèche, nursing home and public open spaces adjacent to the Bord na gCon greyhound stadium along Ballinacloyh River.

The office floor plates will be designed with greater flexibility and adaptability to cater for potential local and multinational users. The proposed neighbourhood centre is strategically located to serve the needs of the local community and residents.

b) Residential Development

Reddy Architecture + Urbanism have designed the residential component of the Masterplan, which consists of 831 no. dwelling units, crèche, nursing home and residential amenity spaces.

The development will be carried out in several phases. The first phase of the development will comprise a Strategic Housing Development (SHD) application for 289 no. dwelling units with a residential density of 40 units/ha, crèche and other associated ancillary uses in line with the Masterplan.

c) Open Space and Landscape Design

Murray & Associates, Landscape Architects have worked closely with both Lafferty and Reddy to develop the landscape concept and design strategy for office campus and residential development respectively. The open space and riverwalk amenity are an essential and vital part of the Masterplan to provide a greater biodiversity and sustainable amenity spaces for the new and existing community in Greenpark.

The above consultants were augmented by the inputs of other members of the Masterplan team (notably flood risk assessment, ecology, drainage and transportation), which further informed the proposed design strategy for the lands.



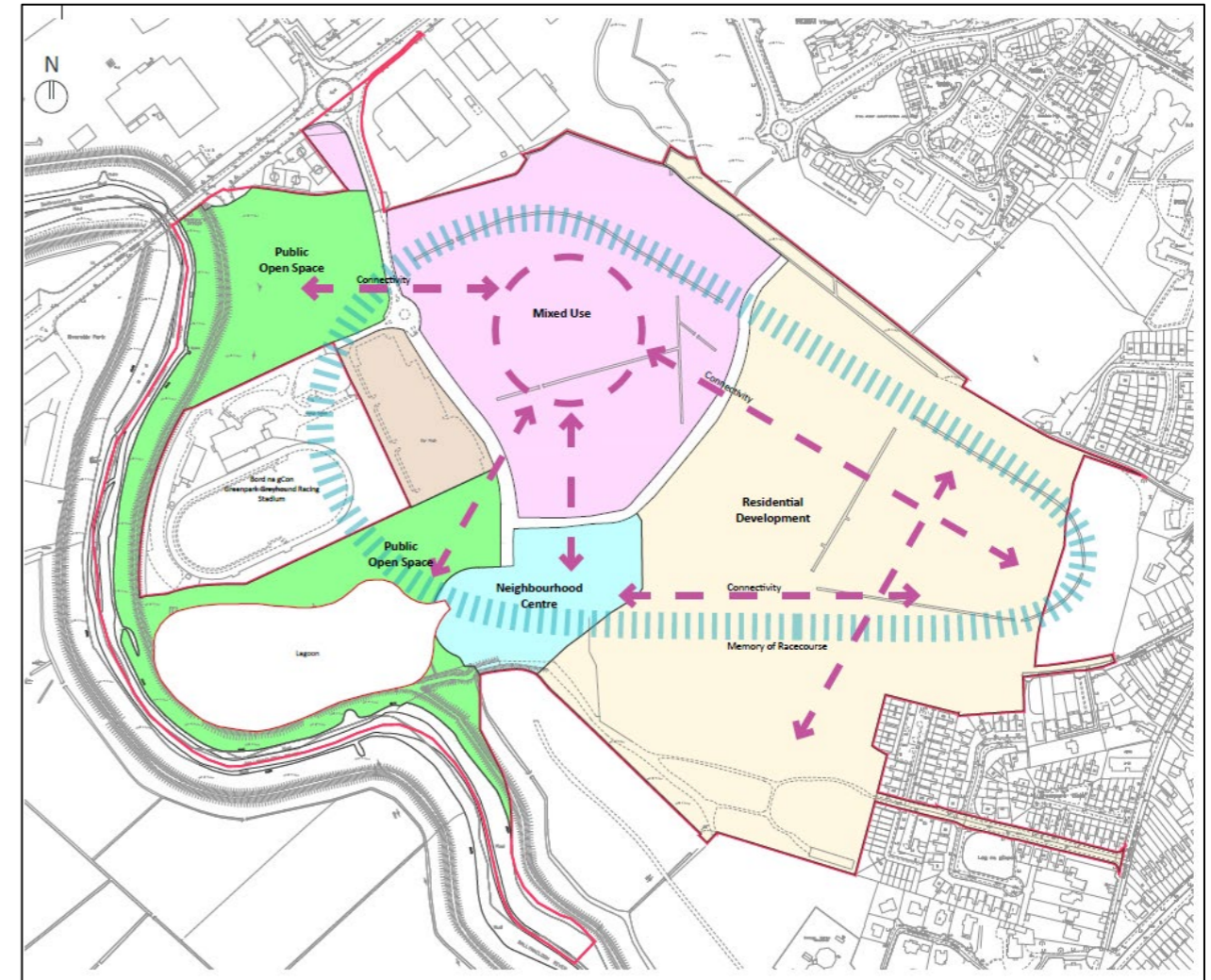
9.3 Overall Key Design Principles

The fundamental objectives of the Masterplan are based on a clear hierarchy of streets, squares and space in between buildings; the layering of scale from residential to commercial, and for cyclists and pedestrians to have priority. Openness, permeability, legibility and a strong sense of place are the driving principles behind the Masterplan.

The collective multi-disciplinary design team has informed the following overall key design principles for the Masterplan:

- To preserve the memory of Limerick racecourse;
- To maximise connectivity and permeability with adjoining and future developments;
- To promote a healthy working and living lifestyle close to public open space with a high degree of biodiversity and sustainability;
- The need to provide well-defined and open spaces/amenity spaces of varying sizes for the enjoyment of the local community;

- The buildings designed to finished floor levels that are safe for access and egress to comply with flood risk mitigation strategy;
- The ability for the office campus and residential development to be built on a phased basis and to be flexible and adaptable to design changes as required;
- To provide residential dwellings to assist both local and national housing delivery;
- The need to provide a robust residential mix to meet all demographic and housings needs with the provision housing, apartments and duplexes across a range of sizes;
- The need to respect and respond to the existing residential amenity adjoining the lands to the east and south-east;
- The desire to create a new community and neighbourhood, which is well integrated into the surrounding areas;
- The vision to create a vibrant new residential development which contributes to the growth of Limerick City and environs;
- To create a dynamic new urban quarter that stitches into the existing urban fabric;
- To provide a positive new live and workplace community;
- To reinforce and respect the existing landscape and amenity value for those who live and work there.



9.4 Residential Design

Our starting point in the creation of a new residential community at the former Racetrack lands is a detailed consideration and analysis of the lands.

This has included a contextual review of the lands; its natural topography; its orientation; boundary conditions and current and potential future connectivity. The design concept sees a natural extension of the existing residential housing west of the South Circular Road, Castlewell, Boreen a Tobair and Greenpark Avenue to the south, with a new sequence of coherent streetscapes and character areas.

A network of open spaces feature in the residential part of the Masterplan, serving each character area and ensuring every phase of housing benefits from a local zone unique to it.

The varying character areas also create individual neighbourhood areas, which will be defined by a variety of housing typologies as noted above.

The scheme responds to the immediate boundary conditions and seeks to create permeable pedestrian and cyclist connectivity to its context. Vehicular access via Greenpark Avenue will be limited to a housing cluster of 30 no. housing units at this location to avoid an over reliance on this access point. Vehicular access for the remainder of the housing will be via the new access road from Dock Road.

The proposed housing will primarily comprise a mix of two storey units, with some corner 3 storey duplex housing to the east complementing the established residential context of South Circular Road, Castlewell, Boreen a Tobair and Greenpark. To the east and along the access road, we envisage a higher scale of linear apartment buildings addressing the scale of the office park.



9.5.1 Connectivity & Linkages

There are strong linkages for pedestrians throughout the development and between the different uses. A number of pedestrian, cycle and vehicular access points have been integrated into the office campus to maximise permeability throughout the scheme and provide connectivity to open spaces and adjoining residential development.

The main access is via existing and extension of an internal access road from Dock Road. Cycle routes within the office campus will provide a 24-hour route through the development from the residential development. The internal circular road will provide access to various parking areas directly to the front of office entrances.

Further permeability and connectivity have been designed and considered within the residential development to encourage and improve mobility and interaction between residents and the wider community.

Pedestrian and cycle access points are provided at Greenpark Avenue and Log Na gCapall, in order to facilitate better access to South Circular Road, the Crescent Shopping Centre and city centre.

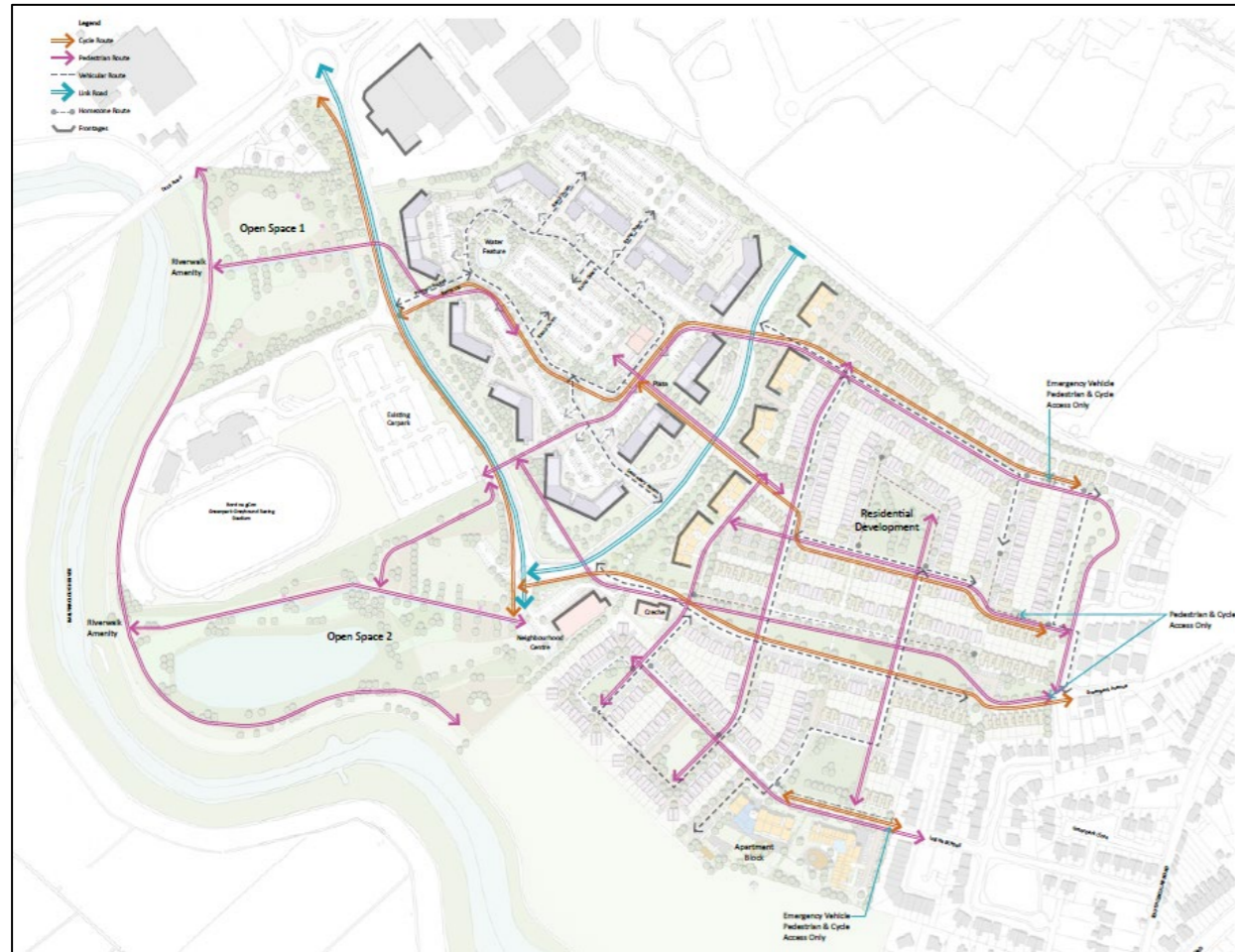
Firefighting personnel and emergency vehicles is provided as necessary throughout the scheme. Alternative emergency vehicular access points are also provided on Greenpark Avenue and Log Na gCapall only in case of emergency.

A limited number of residential units are proposed (c. 30 no. units), which will have direct vehicular access to Greenpark Avenue. It is proposed to create new active frontages, urban repair and surveillance onto open space and to mirror and complete the existing housing development in the area.

The proposed Neighbourhood Centre is centrally located within the overall Masterplan to serve as the hub and focal point for the local community and residents. This is also strategically located for people looking to access the public open space and amenity areas along the river. A childcare facility is also centrally located adjacent to the Neighbourhood centre near the entrance to the residential development.

9.5 Design Principles

The following concept diagrams show the detailed analysis undertaken to contribute towards place making and creating a safe, vibrant and exciting new commercial and residential neighbourhood to live, work, play, visit and enjoy in Limerick.



9.5.2 Open Space Strategy

The proposed riverwalk amenity and open space will connect and contribute to the wider city providing an organic and biodiverse place for locals and residents to enjoy.

The proposed office campus is designed around a sunken landscaped open space, consisting of a water feature, outdoor tiered seating area, café/restaurant and central car parking. A hard landscaped plaza area proposed to the south-east will act as a visual bridge link from the residential development directly to the heart of office campus development. The proximity of open space 1 and 2 will also provide strong connectivity to the riverwalk amenity from the office campus to the Ballinacloyh River.

Open spaces are evenly distributed around the development to ensure good accessibility from residential character areas.

A landscaped zone is provided between the office and residential development to create a privacy strip separating these uses. Smaller semi-private open space, pocket parks, home zones and variety of amenity areas are designed around the residential development for all residents.

9.5.3 Character Areas & Urban Form Concept

All buildings are designed to create strong urban edges and streetscape, which will further promote passive supervision to open spaces and amenity areas and reinforce strong linkages between the various uses.

Corner buildings are proposed at either end of the internal link road in the office campus and provide a sense of enclosure and shelter while also increasing the legibility of the development.

A varied architectural language and strong rhythm will also assist in creating distinct character areas both within the residential development and office campus to enhance the sense of place.

Strong identity and gateway buildings are provided at the entrance to the development. Distinct elevational treatments within each open spaces and character areas will give a strong sense of identity and place making within the development.

9.5.4 Scale and Massing Strategy

The proposed office buildings will be designed to a high standard of specification and generally range from 3-4 storeys in height. The floor plates are capable of sub-division to provide flexibility and adaptability to meet the needs of future end-users. Building height will be potentially increased at certain limited locations (*) to (i) define the entrance to the development (ii) recognise a key corner as a landmark site and (iii) acknowledge where the formal plaza connects to the residential area.

Generally, dwellings will be 2 storeys in height apart from the duplexes and apartment blocks adjacent to the office campus, which will be 3 storeys.

The overall massing has been developed to respond to a range of considerations including the existing site context. Focal buildings may be developed at certain vistas along with appropriate increases in building height to assist with place making and legibility.

9.5.5 Development Quantum

Office Campus			
Site Area	c. 10.3 ha	(24.45 Acres)	
Office Blocks	No. Storeys	Floor Plate (GFA)	Total Area (GFA)
B1	3	1,450	4,350
B2	3	1,125	3,375
B3	3	1,125	3,375
B4	3	1,050	3,150
B5	4	750 + 750	3,000 + 3,000
(Sub-dividable)			
B6	3	1,050	3,150
B7	3	1,050	3,150
B8	4	775 + 775	3,100 + 3,100
(Sub-dividable)			
B9	3	1,125	3,375
B10	3	1,125	3,375
			39,500 m ²
			425,175 ft ²
Cafe Restaurant	450 m ²		
Total Carpark	900 Spaces		

Residential Development	
Site Area	c.17.7ha (43.7 Acre)
Total Dwelling Units	831 units
Density	47 u/ha
Stage 1 - SHD Application (Outlined in Red)	
Site Area	c.7.2ha (17.7 Acre)
Total Dwelling Units	289 units
Density	40.4 u/ha



9.5.6 Levels and Sections

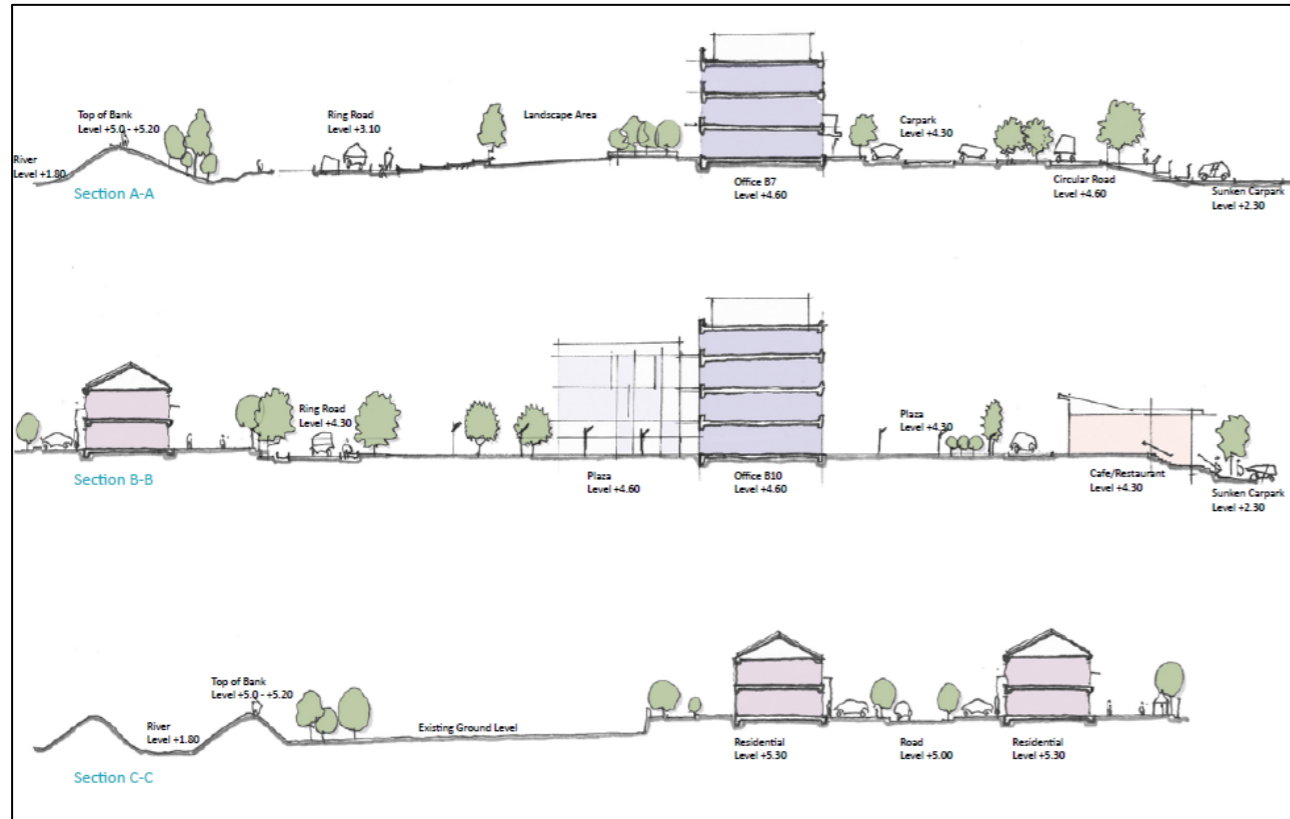
a) Office Campus

The office buildings are designed to a minimum Finished Floor Level of +4.60 AOD. The roads are designed to a safe level of +4.60 AOD as such it is safe for vehicular access in the event of an emergency.

Smaller car parking areas are located in front of the buildings but the majority are located to the rear of the site and in the sunken area at the heart of the development. The level is approximately +2.30 AOD and designed to be as close to existing ground contour as possible to minimise filling

b) Residential Development

All residential buildings are designed to have a minimum Finished Floor Level of +5.30 AOD with access roads, outdoor amenity and play areas at +5.00 AOD.



9.6 Relevant Design Policy and Guidance

The overall Masterplan and the proposed residential development, in particular, has been guided by standards, and objectives set down in the following planning policy documents:

- *Sustainable Residential Development in Urban Areas (Guidelines for Planning Authorities) 2009;*
- *The Urban Design Manual - A Best Practice Guide 2009;*
- *Sustainable Urban Housing: Design Standards for New Apartments (Guidelines for Planning Authorities) 2018;*
- *Urban Development & Building Heights - Guidelines for Planning Authorities 2018;*
- *Guidelines & Policies relating to Childcare Facilities;*
- *Universal Design Guidelines for Early Learning and Care Settings;*
- *Design Manual for Urban Roads and Streets (DMURS);*
- *Universal Design Guidelines for Homes in Ireland;*
- *Building for Everyone: A Universal Design Approach.*

Based on all of the above, the proposed residential development was informed by the following objectives:

- Creation of individual character areas using different material palettes to distinguish small residential enclaves and neighbourhood within the development.
- Each character area has its own pocket park.
- Strong sense of place and community.
- The small residential enclaves are set out as a series of perimeter blocks and streets defined by 2 storey houses and corner buildings enclosing open spaces and shared surfaces.
- Apartments and 3-storey duplex gateway buildings are proposed to define the entry points to residential areas, creating legibility within the movement network and a sense of place.
- Primary vehicular/bicycle/pedestrian access to the development will be from a new junction off the proposed internal access road from Dock Road.
- Secondary bicycle and pedestrian access to the development will be provided from the existing access points at Log Na gCapall and Greenpark Avenue.
- Public open space of varied scale are evenly distributed within the development with a short walk from all residential units and providing a safe and supervised environment for outdoor activities.

The residential design response of the proposed development has been guided by the best practice principles based on to the 12 criteria assessment as set out in the *Urban Design Manual 2009* companion document to the *Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas*.

9.7 Reference Images





APPENDIX A – FLOOD RISK ASSESSMENT (Prepared by RPS, dated December 2020)