Limerick Regeneration Framework Implementation Plan

Environmental Report

For the purposes of Strategic Environmental Assessment

October 2013

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COUNCIL

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1.0 INTRODUCTION

The primary objective of the Strategic Environmental Assessment is to provide for a high level of environmental protection and to contribute to the integration of environmental considerations into the preparation of the Limerick Regeneration Framework Implementation Plan. The core objective of the process is to assess the LRFIP in terms of its overall environmental impact, both positive and negative and to indicate where necessary how improvements can be incorporated into the framework to improve its environmental performance.

This section of the Environmental Report is a non technical summary. The purpose of this section is to ensure that the key issues and findings of the Environmental Report will be readily understood without the use of technical terminology.

2.0 LIMERICK REGENERATION FRAMEWORK IMPLEMENTATION PLAN - A CONTEXT

The LRFIP is a strategic document outlining how the Office of Regeneration intends to facilitate and promote significant social, economic and physical development within the defined regeneration areas in the short, medium and long term. Specifically the LRFIP seeks to

- Improve quality of life and well-being for the communities of the regeneration areas by responding comprehensively to their physical, social, community safety and economic problems; and
- Promote the social and economic inclusion of the regeneration areas into the mainstream life of Limerick city.

The regeneration programme is a highly dynamic process heavily influenced through community involvement, the participation of public agencies, the availability of public funds and the statutory planning process. The programme therefore has significant cognisance of other funding programmes and spatial strategies.

This LRFIP is a practical and strategic framework plan detailing how the regeneration programme is intended to be implemented. It identifies the issues, objectives and associated programmes and actions that will need to be implemented to facilitate regeneration and deliver real change on the ground. Whilst not a land use plan per se, the LRFIP does contain very specific and detailed physical proposals and improvements to the area.

It is intended that the LRFIP will be adopted and given legal effect through a forthcoming review of the Limerick City Development Plan 2010 – 2016 as part of the development plan review process.

3.0 SCOPING

Scoping was undertaken to establish the scope and extent of the Environmental Report and to list environmental issues which would require further consideration during the SEA process.

The issues of concern, raised during the scoping process included;

- Protection of existing Natura 2000 designations;
- Appropriate measures to address existing flooding;
- Need to consider higher level tier plans; and
- Extent of demolition works proposed.

These issues have been comprehensively dealt with in the LRFIP and have influenced the overall strategy and direction of the LRFIP.

4.0 LEGISLATIVE AND POLICY COMPLIANCE

The LRFIP is framed within a hierarchy of national and regional level policy guidelines. A review was undertaken to ensure the consistency of the LRFIP with relevant national, regional and county level policy documents and current environmental legislation. In summary, the LRFIP accords with current national and regional policy and statutory environmental legislation.

5.0 BASELINE ANALYSIS

The baseline data allows for an assessment of existing conditions within the environment. Where possible and where data exists a quantitative measurement of the environmental conditions is provided, however where such information is absent, qualitative descriptions of environmental themes are provided instead.

5.1 Biodiversity Flora & Fauna

The regeneration area of St. Mary's Park and Moyross are located within and adjoining the internationally and nationally designated areas of ecological conservation value including;

- Natura 2000 site 'Lower River Shannon candidate Special Area of Conservation' (SAC site code No. 2165) and;
- the national designation – 'Knockalisheen Marsh proposed Natural Heritage Area' (site code No. 2001).

In addition to these designated habitats there are also a number of other semi-natural habitats of local biodiversity value within each of the four regeneration areas.

5.2 Water

5.2.1 Groundwater and Surface Water

Groundwater quality is protected under the requirements of the Water Framework Directive (2000/60/EEC). Groundwater vulnerability within and surrounding the LRFIP area ranges from "High to Low" with some "Extreme" small pockets.

The Shannon International River Basin District was established in Ireland arising out of the legal requirements of the Water Framework Directive. The Lower River Shannon flows alongside St. Mary's Park and runs adjacent to Moyross. The water quality of the River Shannon is surveyed every three years and was last surveyed in 2009 by the EPA. Meelick Bridge is the closet testing point to the west of Moyross and classifies the waters at this point as good (Q3).

5.2.2 Water Supply and Wastewater

Water supplied by Limerick City Council is regularly monitored and consistently passes the water standards set by the European Drinking Water Directive of 1998. However the existing supply network in St. Mary's Park requires upgrading. The Limerick Main Drainage Scheme is a significant piece of environmental infrastructure which ensures that the EU requirements for the provision of waste water treatment facilities are now being achieved in the city.

5.2.3 Flooding

Indicative OPW flood maps place much of Limerick city centre and some outer lying areas in an area at risk

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from flooding. A significant area of St. Mary's Park regeneration area is located within flood zone A, along with parts of Moyross and a small area of land located on the northern side of a tributary of the Ballinacurra Creek in Southill. The predominant flood threat to the regeneration areas lies in the area of St. Mary's Park and arises from coastal flooding associated with the River Shannon and Abbey River.

5.3 Population & Human Health

The defined regeneration areas occupy almost 3 per cent of the land area of Limerick City and yet accommodate 11 per cent of the total population of the city. Collectively the four regeneration areas include approximately 3,557[1] houses with a population of over 16,283[2] people. The Regeneration Areas have a higher than average youth dependency rate and the single parent family tends to dominate the household structure. The number of people at work (over 15 years of age) in the regeneration areas is significantly lower than the number of those at work in the city and as a result the rate of unemployment in the regeneration areas is significant and well over double the city and State figures of 15 per cent and 12 per cent. The Regeneration Ares in Limerick exhibits an abnormally high level of disability amongst its population particularly when compared to the national figure of 13 per cent.

5.4 Cultural Heritage

The Records of Monuments and Places Map for Limerick shows that there is a significant amount of archaeology located within the Zone of Archaeological Potential in St. Mary's Park that there are three recorded monuments in Moyross, and that there are a large number of recorded monuments alongside the southern boundary of the M7 in Southill. St. Mary's Park which is ocated mostly within a Zone of Archaeological Potential is located within the oldest part of the city and today is commonly referred to as its 'medieval core'. There are no recorded monuments in Ballinacurra Weston. There are no protected structures located within the defined regeneration areas.

5.5 Soil

Soil is lost annually through development on greenfield land. With urban expansion, agricultural land surrounding cities and towns as well as green areas within them are subjected to increasing pressures. Soil types found within the regeneration area range from Marine/Estarine Silts and Clays, Till derived from Limestone, Made Ground and Bedrock. The type and depth of soil has direct implications on water movement which can lead to increased pollution threats if not properly considered.

An old limestone quarry is located within Southill, south of Keyes Park and east of Roxboro Road and was previously used as a landfill for domestic waste. Another old quarry used for the dumping of domestic rubbish is located within Moyross on the opposite side of the city

5.6 Air and Climatic Factors

Air quality monitoring in Ireland is undertaken largely to implement EC Directives on smoke and sulphur dioxide (SO_2), lead, ozone and nitrogen dioxide (NO_2) to assess compliance with national air quality standards. Limerick City Council have three air monitoring stations at Moyross, Southill and the city centre where smoke and sulphur dioxide are continuously monitored. Air quality in Limerick has never yet exceeded EU limits for these parameters. The Air Quality Framework Directive requires that member states divide their territory into zones for the assessment and management of air quality. There are four zones identified in Ireland. Zone C includes Limerick and the air quality for zone C is classified as good.

At a local level the Climate Change Strategy for the Mid West Region identified traffic within Limerick City as the sector with the highest consumption in energy terms (36%) and the greatest output of CO_2 emissions (28%). However the residential sector was found to be the highest contributor in terms of emissions, at 30% of CO_2 emissions

5.7 Noise

There is no national standard for recommended noise thresholds in Ireland. The Limerick City Development Plan states that the noise level arising from any commercial development should not exceed 55dB LAeq during the daytime, and 45dB LAeq during the night, when measured at the site boundary. Limerick City and County Councils have prepared a Draft Noise Action Plan aimed at strategic long term management of environmental noise from transport systems in both Limerick City and County. Strategic Noise Maps were prepared for all relevant motorways and national routes and a number of noise "hot spots" identified. There is one hotspot prioritized for noise management within the regeneration area namely the junction of the R445 and R463 on King's Island.

5.8 Landscape & Amenity

There is currently no published landscape mapping for Limerick city or for the country. There are no regional or local designations affecting the urban sites. However, the green areas, the natural heritage and recreational amenities within the LRFIP have the potential to play a key role in creating and sustaining place. Aerial views of the regeneration areas depict a landscape in transition between completed and occupied development, demolished and vacant sites and semi completed works. Quality recreation and leisure facilities have a fundamental impact on the quality of life in a city and to its social integration and cohesiveness. Amenities within the regeneration areas include natural and recreational amenities as well as social and community infrastructure.

5.9 Material Assets

For the purposes of this section of the report the Material Assets section includes Transportation, Waste Management,

5.10.1 Transportation

A significant challenge facing the LRFIP is the existing road network and the lack of connections into and within the regeneration areas which isolates the regenerations areas from the rest of Limerick city and exacerbates existing social problems. With car ownership relatively low in the regeneration areas there is still a desire to encourage other modes of transport. It is therefore a challenge for the LRFIP to meet the growing demand for travel by sustainable forms of transport other than private car including public transport, walking and cycling. There are no delineated cycle lanes currently within the regeneration areas with weak pedestrian connections and linkages.

[1] CSO 2011 figures [2] Ibid

5.10.2 Waste Management

The Replacement Waste Management Plan for the Limerick/Clare/Kerry Region 2006-2011 sets out the current regional policy framework to progress the sustainable management of waste arising in the region to 2011. Targets of 45% recycling, 41% thermal treatment and 14% disposal were set. A recent evaluation of the strategy confirmed that household recycling was at 13.9% in 2004 and now has reached 42%. Commercial recycling has increased to over 60%.

6.0 ENVIRONMENTAL PROTECTION OBJECTIVES

In order to achieve the aim of assessing and improving the environmental performance of the LRFIP a number of Environmental Protection Objectives (EPOs), specific to each environmental topic have been formulated. EPOs are separate to the LRFIP objectives and are developed from international and national policies which generally govern environmental protection objectives. Such policies include those of various European Directives which have been transposed into Irish law and which are intended to be implemented across the country. The EPOs are used to assess the proposed development measures of the LRFIP, in order to evaluate and identify where conflicts may occur.

7.0 DESCRIPTION OF ALTERNATIVE SCENARIOS

The issue of alternatives is necessary in assessing the overall philosophy of the LRFIP. In accordance with the guidelines the alternatives put forward are realistic and capable of implementation.

Scenario 1
Business as Usual - This scenario seeks to work under the existing statutory provisions of the Limerick City Development Plan 2010 – 2016 (CDP).

Scenario 2
Existing Masterplans - This scenario proposes to continue to work with the two separate masterplans prepared for the Northside and Southside Regeneration Areas in 2008.

Scenario 3
Preparation of a Framework for the sustainable regeneration of St. Mary's Park, Moyross, Ballinacurra

Schedule of Environmental Protection Objectives

B1	To ensure compliance with the Habitats Directive with regard to the protection of Natura 2000 Sites and Annexed habitats and species
B2	To effectively manage other environmental features and maintain wildlife corridors which are of major importance for wild fauna and flora and essential for the migration and dispersal of wild species
B3	To avoid significant impacts on relevant habitats, species, environmental features or other sustaining resources in Wildlife Sites
W1	To prevent impacts upon the status of any waters in line with the recommendations outlined in the Shannon River Basin Management Plan
W2	To ensure an adequate supply of potable drinking water
W3	To reduce and manage the risk of flooding
PH1	To protect and enhance people's quality of life based on high quality residential, community, working and recreational environments and on sustainable travel patterns.
CH1	To avoid unauthorised impacts upon archaeological heritage (including entries to the RMP) and architectural heritage (including entries to the RPSs)
S1	To minimise effects upon the sustainable use of land, mineral resources or soils
AC1	To assist and facilitate the achievement of higher level targets contained in the targets relating to the Kyoto Protocol
N1	To maintain and, where possible, improve acoustical quality for the current and future residents of the regeneration area
LA1	To conserve and enhance valued natural landscapes and features within them including those of geological value
MA1	To reduce traffic levels by encouraging modal change from car to more sustainable modes of transport such as public transport, walking & cycling
MA2	To reduce the generation of waste and adopt a sustainable approach to waste management

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Weston and Southill. This scenario would provide an updated strategy on how the area should be developed and regenerated in line with best sustainable practice and having regard to the social, economic and physical needs of the residents.

8.0 EVALUATION OF ALTERNATIVE SCENARIOS

The three scenarios were evaluated against the EPOs established in Section 6.0.

Scenario 1

Business as Usual - Although the zoning set out in the Limerick City Development Plan 2010 – 2016 (CDP) covers all components needed to physically regenerate the four identified areas into functioning neighbourhoods the detail is at the broad scale and does not provide an integrated programme of physical, social and economic improvements. This scenario would not be in compliance with the objectives of the CDP which requires the preparation of Framework Plans for the regeneration areas. It would further be contrary to the key objective set out under the National Housing Policy Statement 2011 which seeks to improve the quality of existing social housing stock through regeneration and improvement work programmes and the return of vacant stock to effective use within the shortest timeframes possible.

Scenario 2

Existing Masterplans - The Masterplans prepared in 2008 focused on complete demolition and the development of new neighbourhoods which would have resulted in extensive displacement of the population and resultant disturbance to community life. Significant demolition waste would also have been generated contrary to the objectives of the Replacement Waste Management Plan for Limerick/Clare/Kerry Region 2006 – 2011. The masterplans were not prepared under the guidance of strategic environmental assessment and so proposals to develop areas within existing floodplains and in proximity to designated sites were not fully evaluated and could be contrary to international and national environmental legislation Similar to scenario 1, this scenario would be contrary to the key objective set out under the National Housing Policy Statement 2011

Scenario 3

Preparation of a Framework for the sustainable regeneration of St. Mary's Park, Moyross, Ballinacurra Weston and Southill.

This scenario is loosely based on strategic objectives of the 2008 masterplan and complies with the requirement in the CDP that detailed framework plans be prepared for the regeneration areas. This scenario therefore amalgamates parts of both of the previous options. The Framework Plan allows for a more in-depth analysis of the regeneration areas and provides a realistic strategy from which to aid the regeneration in a structured and coherent manner.

Preferred Option

The preparation of a framework for the sustainable regeneration of St. Mary's Park, Moyross, Ballinacurra Weston and Southill was selected as the preferred approach. This approach was selected as it was considered to best conform to international and national legislation and policy, thereby ensuring minimal impact on the environment. This approach has been found to have the most positive impact on the environment.

9.0 EVALUATION OF LRFIP PROVISIONS

The LRFIP as a non-statutory plan acts as a tool for coordinating development and implementing regeneration within four statutorily designated areas within Limerick City. The development measures of the LRFIP were tested against the Strategic Environmental Objectives developed earlier in Section 6.0. The methodology employed was the accepted and commonly used methodology of creating a matrix, whereby development measures contained in the LRFIP area listed on one axis and the environmental protection objectives devised through the SEA process are detailed on the other.

9.1 Biodiversity Flora & Fauna

The LRFIP was found largely to have potential for significant beneficial effects on the biodiversity, flora and fauna of the area. The overall approach of the LRFIP is to concentrate new development on infill or underutilised sites within an existing built-up, urban area whilst avoiding more environmentally sensitive and vulnerable sites. This approach is particularly relevant to St. Mary's Park which is deemed to be the most sensitive of the four regeneration areas from a biodiversity, flora and fauna perspective having regard to the SAC designation which surrounds the island.

9.2 Water

The LRFIP was largely found to have likely significant beneficial impacts on water in the area of water supply through the upgrade of infrastructure in St. Mary's Park, in the area of wastewater treatment as there is adequate capacity to accommodate population growth in the recently upgraded system and in other areas such as greening the landscape and protecting and improving biodiversity and areas of environmental importance.

Much of St. Mary's Park is also located within flood zone A, along with parts of Moyross and a small area of land located on the northern side of a tributary of the Ballinacurra Creek in Southill. Only refurbishment works and replacement new-build housing on vacant sites arising from the demolition of existing housing will be permitted in flood zone areas. No additional new build housing is proposed. A detailed justification test was undertaken to support this strategy and approach and demonstrates 'exceptional circumstances' in the case of St. Mary's Park. Therefore the LRFIP can also be deemed to be largely beneficial in the area of flooding.

9.3 Population and Health

The development measures set out in the LRFIP have been found to have overall significant beneficial impacts on population and human health. The LRFIP focuses in particular on mechanisms that deliver the necessary physical, social and environmental infrastructure to improve quality of life for residents of the regeneration area. The framework emphasises the need to promote ease of movement both within the regeneration areas but also externally with the wider city. The open space and public realm strategy further seeks to improve quality of life through the reconfiguration of unused area of open space, the creation of wildlife corridors and linkages and high quality public open space. Economic objectives within the LRFIP seek to build employment nodes around key

locations that already offer employment opportunities. The Housing Strategy firstly focuses on a programme of refurbishment and proposes to refurbish 1,504 no. existing units. It also proposes a programme of demolition and replacement housing with 605 no. units proposed for demolition (over half of these units are located in Moyross). A housing replacement strategy provides for 605 no. units thereby accommodating those who have been displaced on foot of demolition. Whilst the provision of refurbished houses and new housing is of direct beneficial impact in terms of quality of life, the impacts from a social perspective in terms of temporary and permanent relocation and displacement of people out of their community and the breakdown of community structures have not been fully assessed. However, on balance the impacts must be considered to be beneficial as the overall quality of life of the environment is improved for the population of the area.

9.4 Cultural Heritage

Overall the impacts of the LRFIP were found to have a mixture of potential significant beneficial impacts on the cultural heritage of the area and insignificant impacts. There is a limited amount of archaeological heritage features within the regeneration areas with the exception of St. Mary's Park where the southernmost part of the regeneration area is located within a Zone of Archaeological Potential.

9.5 Soils & Geology

The LRFIP will have overall beneficial impacts on soil and geology. Redevelopment of brownfield sites and underutilised vacant sites are promoted in the LRFIP along with vacant buildings. Limited greenfield development is promoted in the longer term at key locations which would contribute to the overall quality of the built form.

9.6 Air & Climatic Factors

Overall the LRFIP will have significant beneficial impacts on air and climatic factors. Emissions from the transport sector are the main threat to air quality and whilst the LRFIP does propose a number of strategic road connections, the main emphasis in the LRFIP is to improve internal and external connections within the regeneration areas thereby encouraging movement by foot and by bicycle. Some short-term impacts on climatic factors will occur (particularly in relation to the emissions of greenhouse gases and use of energy) as a result of increased development and construction but these would not be considered significant. Furthermore regard must be had to the refurbishment strategy which will have a beneficial impact on reducing greenhouse gases as all houses are refurbished to a minimum of a BER C rating.

9.7 Noise

Overall the LRFIP will have significant beneficial impacts on noise and maintaining the existing acoustical quality for current and future residents. Traffic noise is the dominant noise source in the area. The emphasis throughout the LRFIP is on reducing the need to travel by private car whilst encouraging and facilitating modal change to more sustainable forms of transport e.g. travel by foot, bicycle and public transport. Whist some temporal noise impacts may arise during demolition and construction these can be mitigated against through the control of hours of work.

9.8 Landscape and Amenity

The LRFIP will serve to have potential significant beneficial impacts overall on landscape and amenity. The existing built environment within the regeneration area is visually poor and proposals to refurbish, demolish, restructure and undertake new build will all serve to enhance the visual appearance of the area.

9.9 Material Assets

Overall the LRFIP will have significant beneficial impacts on transport in the area. The need for a greater modal shift from private car to more sustainable forms of transport is emphasised throughout the framework. The LRFIP also seeks the completion of the internal street networks, improvement in terms of access from residential areas to public transport and the completion of a green route connecting open space amenity.

The LRFIP will serve to have negative to neutral impacts on waste management as the proposal to demolish houses will result in significant adverse impacts from a waste management perspective. However it is considered that such impacts could be mitigated through the implementation of a waste management plan for the physical housing programme in the regeneration area focusing on the recycling and reuse of demolition waste generated by regeneration programme.

10.0 MITIGATION MEASURES

While every effort will be taken to ensure that the impact of the LRFIP on the environment is neutral to positive, certain unavoidable negative impacts may occur as a result of the implementation of the LRFIP. The Environmental Report details mitigation measures to reduce or eliminate identifiable adverse impacts. A schedule of monitoring and reporting is proposed in order to ensure that any unforeseen negative impact is identified at the earliest opportunity and subsequently appropriate mitigation measures are put in place to eliminate or at a minimum limit the level of impact to an acceptable degree.

In general terms, all proposals for development will be required to have due regard to the environmental considerations outlined in the LRFIP and the Limerick City Development Plan 2010 – 2016.

11.0 MONITORING

Monitoring of the LRFIP and its implications on the environment is paramount to ensure that the environment of the regeneration area is not adversely affected through the implementation of the plan. While considerable environmental data is directly available to the Office of Regeneration from other departments within the City Council including water quality, recycling rates etc, other sources of information will be accessed to provide a comprehensive view of the effect of the LRFIP. In this regard the Office of Regeneration will work with other agencies with environmental mandates to gather data for the purposes of monitoring the implementation of the LRFIP. Therefore, while monitoring specific elements of the environment is not strictly the preserve of the Office of Regeneration, they will continue to liaise and work with the Environmental Protection Agency, The National Parks and Wildlife Service, The Fisheries Board, as well as others in the

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pursuit of environmental conservation and protection through existing environmental monitoring procedures.

Environmental Indicators are provided where relevant to the LRFIP and presented as a yardstick against which the plans success can be monitored. The indicators have been prepared specifically for the LRFIP tailored to reflect the issues of major concern in the area. The indicators aim to simplify complex interrelationships and provide information about environmental issues which easily understood.

12.0 CONCLUSION

It is acknowledged that a planned and holistic approach to the orderly regeneration of the areas is required. Development is both necessary and desirable to achieve regeneration and economic growth within the areas and the purpose of the Strategic Environmental Assessment is to ensure that the guiding principals for development do not impact in an adverse manner on the environmental quality of the plan area. The assessment process which has been carried out in conjunction with the preparation of the LRFIP, allowed for an early indication of the potential environmental effects and this resulted in changes and alterations throughout the course of preparation.

In summary, the development measures put forward in the LRFIP were found to be acceptable in terms of protecting the environmental quality within the regeneration areas. Monitoring of the plan throughout its lifetime will ensure that any potential adverse environmental impacts, unforeseen at this stage will be identified early, so as to prevent any deterioration of the environment. The LRFIP, as currently presented, balances regeneration and economic growth with environmental protection and conservation and encompasses fully the ethos of sustainability.

1. Introduction and Terms of Reference

1.1 INTRODUCTION

This is the Draft Environmental Report for the Draft Limerick Regeneration Framework Implementation Plan (LRFIP) Strategic Environmental Assessment (SEA). The LRFIP is intended as a practical expression of the framework for regeneration proposed across four distinct areas within Limerick City including Southill, Ballinacurra Weston, Moyross and St. Mary's Park

The SEA has been undertaken in order to anticipate and avoid adverse impacts arising from the LRFIP. This will facilitate the development of detailed physical regeneration proposals as outlined in the LRFIP in a sustainable way that will ensure that such development will be delivered, having regard to the carrying capacity of the receiving environment. The purpose of this SEA Environmental Report – which should be read in conjunction with the LRFIP – is to provide a clear understanding of the likely environmental consequences of decisions arising from the LRFIP.

1.2 SEA DEFINITION

Environmental assessment is a procedure that ensures that the environmental implications of decisions are taken into account before such decisions are made. Environmental Impact Assessment, or EIA, is generally used for describing the process of environmental assessment for individual projects, while Strategic Environmental Assessment (SEA) is the term which has been given to the environmental assessment of plans and programmes, which help determine the nature and location of individual projects taking place.

SEA is a systematic process of predicting and evaluating the likely significant environmental effects of implementing a proposed plan or programme. Such process is necessary in order to ensure that such environmental effects are adequately addressed at the earliest appropriate stages of decision making in tandem with economic, social and other considerations. Significant regeneration works will take place within the four identified regeneration areas in Limerick City over the next few years and this work will be guided by the overall strategy and approach detailed in the LRFIP. By anticipating the effects of implementing the LRFIP and avoiding those which cannot be sustainably accommodated, real improvements in environmental management and planning can occur.

Benefits of considering environmental effects at this highest level include that the:

- scope of lower tier environmental assessments which may be required are likely to be reduced;
- impacts arising from projects are also likely to be reduced; and
- planning applications arising from the LRFIP are more likely to be granted consent.

1.3 SEA DIRECTIVE AND ITS TRANSPOSITION INTO IRISH LAW

Directive 2001/42/EC of the European Parliament and of the Council of Ministers, of 27 June 2001, on the Assessment of the Effects of Certain Plans and Programmes on the Environment, referred to hereafter as the SEA Directive, introduced the requirement that SEA be carried out on plans and programmes which are prepared for a number of sectors. The SEA Directive was transposed into Irish Law through the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (Statutory Instrument Number SI No. 435 of 2004) and the Planning and Development (Strategic Environmental Assessment) Regulations 2004 (SI No. 436 of 2004). Both sets of Regulations became operational on 21 July 2004. The Regulations have been amended by the European Communities (Environmental Assessment of Certain Plans and Programmes) (Amendment) Regulations 2011 (SI No. 200 of 2011) and the Planning and Development (Strategic Environmental Assessment) (Amendment) Regulations 2011 (SI No. 201 of 2011).

1.4 LEGAL FRAMEWORK FOR THE DRAFT LIMERICK REGENERATION – FRAMEWORK IMPLEMENTATION PLAN SEA

The European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (SI No. 435 of 2004) as amended requires the carrying out of an environmental assessment for all plans and programmes (a) which are subject to preparation and/or adoption by an authority at national, regional or local level and which set the framework for future development consent of projects listed in Annexes I and II to the Environmental Impact Assessment Directive, or (b) which are not directly connected with or necessary to the management of a European site but, either individually or in combination with other plans, are likely to have a significant effect on any such site.

The environmental assessment must be carried out by the competent authority of the plan or programme; in addition an Environmental Report (ER) must be prepared during the preparation of the plan or programme. The Office of Regeneration, Limerick City Council is the competent authority with respect to the Draft LRFIP. Prior to making a decision on the scope and level of detail of the information to be included in the ER, Limerick City Council gave notice to the relevant environmental authorities indicating that a submission may be made on the scope and level of detail of the information to be included in the ER. This ER identifies, describes and evaluates the likely significant effects on the environment arising from the LRFIP and reasonable alternatives, taking account of the objectives and the geographical scope of the LRFIP. For this purpose it contains the information specified in Schedule 2 of the Regulations and takes into account scoping submissions received from the EPA and comments received from the Planning Department of Limerick City Council.

The LRFIP in its current state sets the framework for future development but, crucially does not provide the framework for consent of projects listed. It is intended that the LRFIP will be adopted and given legal effect through a forthcoming review of the Limerick City Development Plan 2010 – 2016 as part of the development plan review process.

The ER is at the heart of the SEA process as it is a key mechanism in promoting sustainable development, in raising awareness of the significant environmental issues and in ensuring that such issues are properly addressed within the capacity of the planning system to do so. There has been complete integration between the preparation of this ER and the LRFIP allowing for the LRFIP to be informed by environmental considerations from the outset. The ER guided the formulation of the overall vision for the LRFIP and influenced the extent, location, type and format of regeneration intervention considered and

1 "plans and programmes" mean plans and programmes, as well as any modifications to them (a) which are subject to preparation and/or adoption by an authority at national, regional or local level or which are prepared by an authority for adoption, through a legislative procedure by Parliament or Government, and (b) which are required by legislative, regulatory or administrative provisions. (SI No. 435 of 2004, Interpretation)
2 "competent authority" means the authority which is, or the authorities which are jointly, responsible for the preparation of the plan or programme. (SI No. 435 of 2004, Interpretation)
3 The environmental authorities are the (i) Environmental Protection Agency (EPA); (ii) Minister for the Environment, Heritage and Local Government, (iii) Minister for Agriculture, Marine and Food, (iv) the Minister for Communications, Energy and Natural Resources, and (v) Limerick County Council.

1. Introduction and Terms of Reference

recommended within the LRFIP.

The likely significant effects on the environment of implementing the LRFIP, and reasonable alternatives, are described and evaluated in this report. In accordance with Directive 2001/42/EC, this report includes information that may be reasonably required taking into account:

- Current knowledge and methods of assessment,
- The contents and level of detail in the LRFIP,
- The stage of the plan in the decision-making process, and
- The extent to which certain matters are more appropriately assessed at different levels in the planning process in order to avoid duplication of assessment.

2. Limerick Regeneration Framework Implementation Plan - A Context

2.1 PRACTICAL CONSIDERATIONS

The LRFIP is a strategic document outlining how the Office of Regeneration intends to facilitate and promote significant social, economic and physical development within the defined regeneration areas in the short, medium and long term. The exact location and extent of the regeneration areas are identified in Figure 2.1. Specifically the LRFIP seeks to

- Improve quality of life and well-being for the communities of the regeneration areas by responding comprehensively to their physical, social, community safety and economic problems; and
- Promote the social and economic inclusion of the regeneration areas into the mainstream life of Limerick city.

The LRFIP thereby draws on the Europe 2020 strategic framework of smart, sustainable and inclusive growth. The regeneration programme is a highly dynamic process heavily influenced through community involvement, the participation of public agencies, the availability of public funds and the statutory planning process. The programme therefore has significant cognisance of other funding programmes and spatial strategies.

This LRFIP is a practical and strategic framework plan detailing how the regeneration programme is intended to be implemented. It identifies the issues, objectives and associated programmes and actions that will need to be implemented to facilitate regeneration and deliver real change on the ground. The LRFIP also establishes the parameters and criteria for the processes by which subsequent decisions affecting regeneration will be made. Whilst not a land use plan per se, the LRFIP does contain very specific and detailed physical proposals and improvements to the area. These proposals will of course be subject to the planning application process and thus will be individually assessed in accordance with standard planning requirements.

It is intended that the LRFIP will be adopted and given legal effect through a forthcoming review of the Limerick City Development Plan 2010 – 2016 as part of the development plan review process.

Subjecting the LRFIP to the statutory SEA process will assist in the effective and speedy implementation of the regeneration objectives thus improving and/or enhancing the environmental sustainability of its objectives through the use of environmental objectives, targets and monitoring to off set any predicted environmental effects. The SEA is based on consideration of a number of variables including inter-alia: baseline environmental sensitivities of the location; the carrying capacity of the environment to accommodate the project; determination of the characteristics of the LRFIP project; and the likely significant effects of the project on the environment. In parallel, consideration will be given to the cumulative relationship and interaction of the LRFIP with existing spatial, social and environmental plans, strategies, policies and guidelines, and environmental designations applicable to the LRFIP areas. The output of the process is the delivery of a coherent set of environmental objectives, targets and indicators to enable the effective implementation of the Framework Plan in the manner envisaged without adverse effects on the environment.

The LRFIP incorporates advice and comments received from the Environmental Protection Agency (EPA) and the Department of Environment, Community and Local Government. It is accompanied by this SEA ER, which was prepared following a scoping exercise, in line with emerging best practice for the carrying out of SEAs. As such, the recommended mitigation measures, in many instances, have already been incorporated into the LRFIP in an iterative process, some of which have brought about significant changes in the scope and extent of work and intervention required. All mitigation measures recommended by the SEA process have been integrated into Section 9.0 of the ER

2.2 BACKGROUND

The LRFIP originates from the separate Northside and Southside Regeneration Masterplans which were prepared for Moyross & St. Mary's Park on the Northside and Southill & Ballincurra Weston on the Southside in 2008, by two separate design teams. The two masterplans proposed the demolition of all housing, community and retail facilities and their replacement with new, better quality neighbourhoods. A draft SEA was prepared for these masterplans in 2008.

However these masterplans were developed in a different economic era at a time of budgetary surplus rather than the current deficits. Thus in 2010, a review was undertaken having regard to current economic constraints, to specifically focus on a strategy of retention, renovation and remodelling in contrast to the extensive demolition originally proposed. This review resulted in the preparation of draft Framework and Implementation Plans for each of the four regeneration areas. As part of the review a process of Strategic Environmental Assessment was engaged for each of the Draft Framework and Implementation Plans in 2011, completed to different stages as follows:

- A screening report and environmental report was prepared for Moyross;
- A screening report was prepared for Southill followed by detailed consultation with the statutory bodies; and
- A screening report was prepared for Ballinacurra Weston followed by detailed consultation with the statutory bodies.

These studies have informed the background to this SEA process.

In June 2012, the Limerick Regeneration Agencies were disbanded and the regeneration function subsumed within Limerick City Council under the Office of Regeneration. The Office of Regeneration has spent the past year refocusing regeneration efforts with the central aim of achieving balanced sustainable neighbourhoods. The principle of full or large scale

2. Limerick Regeneration Framework Implementation Plan - A Context

demolition has been reassessed with the scale of demolition required to meet the overall objective needing consideration on a house-by-house, area-by-area basis.

2.3 OBJECTIVE AND TIMEFRAME

The purpose of the LRFIP is to present a single holistic and integrated spatial Framework Plan with detailed social, physical, economic and environmental objectives for all four regeneration areas within Limerick City. Its overall objective is to plan for the future development of the area, provide guidance for the phased implementation and the associated costs, and to present a framework plan for regeneration that can be adopted into the Limerick City Development Plan. The physical objectives therefore present the potential for the LRFIP to present significant effects and challenge to environmental resources of this area during the plan period. The LRFIP Plan is not a statutory landuse plan per se and therefore does not have a legal or definitive timeframe. It is however reasonable to assume that the LRFIP plan could be in place for five to six years and may be subject to interim periodic update or cyclical review in combination with statutory development plan (Limerick City) process.

The vision and strategy of LRFIP are shaped by an analysis of the socio economic and physical context of each of the regeneration areas and by an analysis of the policy context in the key fields of planning and environment, social and economic policy, taking into account the policy frameworks from EU, through national to local levels. An integrated approach to regeneration has been adopted with specific objectives of the strategy and associated interventions / actions in the LRFIP structured around three pillars: Physical, Social and Economic. Whilst these interventions are developed in detail throughout the LRFIP, the key objectives are detailed in Table 2.1 below and give a flavor of the overall objectives of the LRFIP.

The most fundamental revision in the current objectives of the regeneration programme is the move from the comprehensive redevelopment and replacement of the public residential stock to a mixed physical programme that includes redevelopment and refurbishment of this stock complemented by the

1. Physical	2. Social	3. Economic
Removal of infrastructural barriers to connectivity	Education and learning initiatives over the life course	Sectoral training, work experience / work placement and job placement
Develop connecting routes within regeneration areas	Health and well-being of the population	Economic engagement, platform focused on regeneration areas (multi-stakeholder)
Community safety via design and CCTV monitoring	Ageing well neighbourhoods	Social innovation/social enterprise hubs (support services and new enterprise)
New housing construction, mixed unit size and type to support diversity	Employability and work interventions for groups distant from the labour market	Niche economic activities (working up to intermediate and smart and sustainable growth sectors such as green technology)
Renewal / retrofitting of existing housing	Targeted support for families with difficulties and youth at risk	Develop a knowledge economy sub-sector in community development and community enterprise
Energy efficiency improvements in buildings	Community development, empowerment and capacity building	Inward investment / long term revolving loan financing for new public / social and educational infrastructure
Social and educational infrastructure renewal / adaptation and new build		ICT development to support economic and social development objectives
Landscape, environmental protection and management		

Table 2.1 Core Strategic Objectives Across Sectoral Pillars

Figure 2.1 Four Defined Regeneration Areas

identification of specific areas suitable for private sector residential development in order to address a reduction in the available public finances and the obligation to provide an additional 4,400 units to address the Core Strategy population objectives for Limerick City.

2.4 GEOGRAPHIC AREA AND PHYSICAL OBJECTIVES

The regeneration study area within the LRFIP presents a diverse mix of physical, environmental, cultural and environmental variables. The regeneration area relates to four geographically separate and primarily residential areas within Limerick City as defined in Figure 2.1 namely the neighbourhoods of St. Mary's Park, Moyross, Ballinacurra Weston and Southill. Each of these areas is described in turn.

2. Limerick Regeneration Framework Implementation Plan - A Context

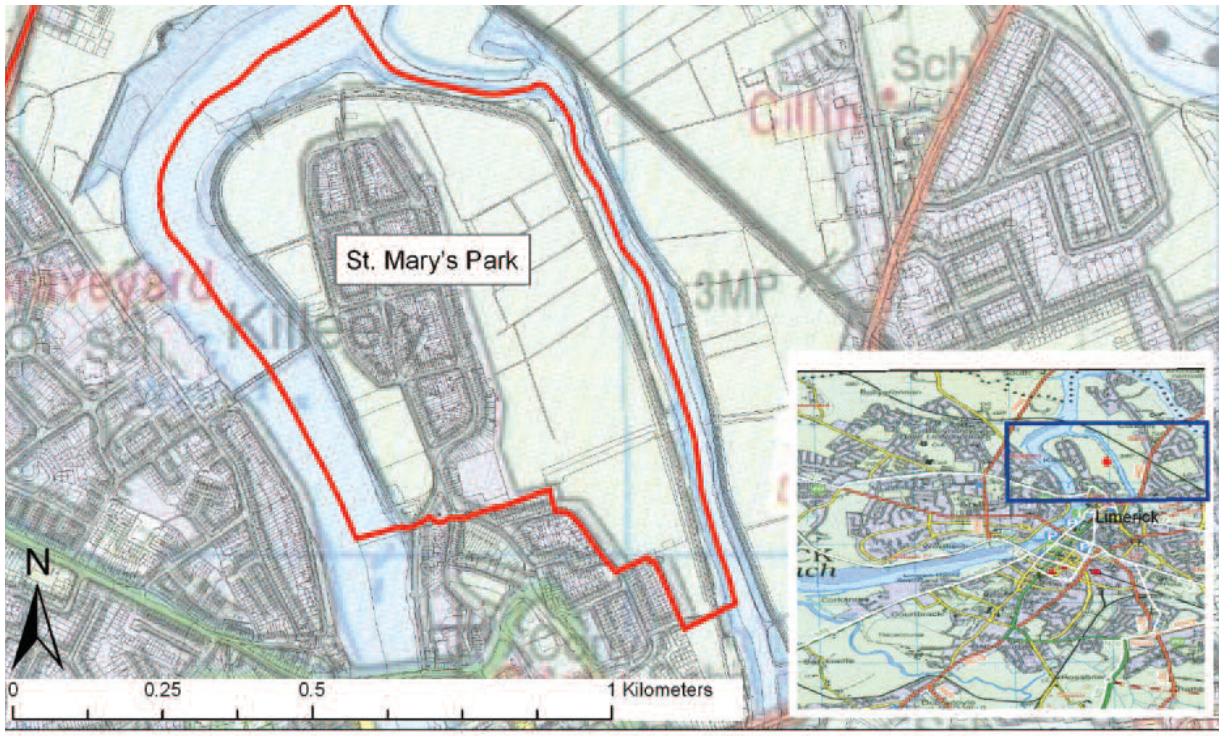

Figure 2.2 Defined Regeneration Area for St. Mary's Park

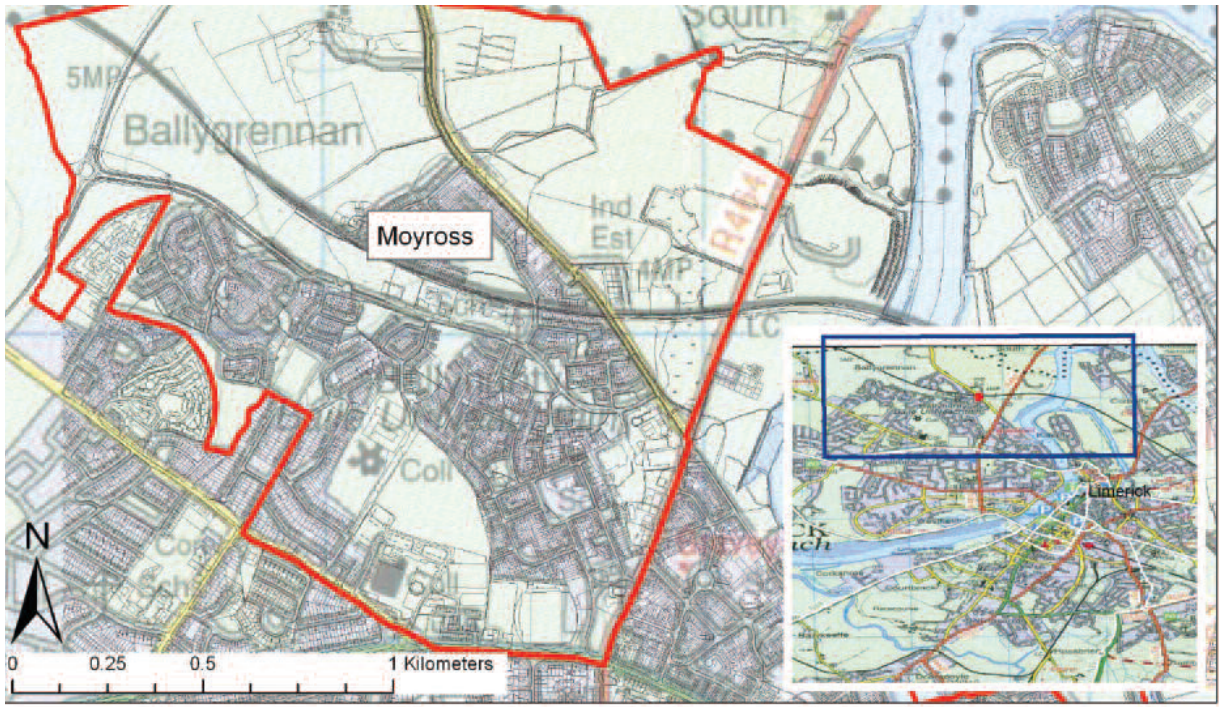

Figure 2.3 Defined Regeneration Area for Moyross

2.4.1 St. Mary's Park

St. Mary's Park located on the northern half of King's Island is situated north east of Limerick City Centre. Kings Island is framed by the River Shannon to the north and west and the Abbey River to the east and south and extends over an area of 68.7 hectares (see Figure 2.2). Whilst the area maintains important ecological, archeological and tourism significance, it still functions as an established residential area. With a population of 863 persons within the defined regeneration area and 308 residential units, this regeneration area has an ageing housing stock with 65% constructed between 1919 -1945 (CSO, 2011).

While the southern part of the island is a lively area with a mix of land uses, the area to the north is predominantly residential. Poor transport connections has resulted in the isolation of St. Mary's Park and disconnection from the rest of the City. King's Island features a delicate ecological environment along its eastern edge, which has been designated as a Special Area of Conservation. In addition, the island has a significant architectural and archaeological heritage, containing the remains of the Limerick City Walls and a number of surviving buildings from the 12th and 13th century.

2.4.2 Moyross

Moyross lying to the north of Limerick City covers an area of approximately 200 hectares (see Figure 2.3). The Knockalisheen Road provides the main access to Moyross at two points to the north and south east of the development. Developed between 1973–1987 it has a population of 2,366 people living in 858[6] houses divided into twelve separate estates. This makes Moyross the largest public housing estate in the country.

Perhaps the biggest single issue for Moyross is the lack of connectivity between it and surrounding neighbourhoods. Even within the defined regeneration area, movement is obstructed with illegible block layouts with each sub estate consisting of large cul-de-sacs. Given this lack of permeability into and across the study area, access to employment and services is poor contributing to its social-economic problems.

[6] CSO 2011 figures

2.4.3 Ballinacurra Weston

Ballinacurra Weston forms part of an inner urban suburb of Limerick City southwest of the city centre comprising of over 14 hectares of land. The area is bounded by Childers Road and Hyde Road to the east and south and Byrne Avenue and Prospect Hill to the north and west (see figure 2.4). With a population of 561 persons and 212 residential units (Census 2011), Ballinacurra Weston is primarily a residential area.

Despite its strategic location on the southern fringe of Limerick City Centre, it remains disconnected from its urban surroundings due to a number of factors including inter-alia; a complex socio-economic profile, its constrained physical layout and lack of internal permeability.

2.4.4 Southill

Southill is located adjacent to the Limerick Southern Ring Road (M7) approximately 1.5km south of the city centre. Comprising over 231 hectares and with a population of 2,493 persons the defined regeneration area incorporates a mix of landuses including residential, commercial, industrial and retail. However with 1,179 housing units dispersed within four residential neighbourhoods (Carew Park, Kincora park, Keyes Park and O'Malley Park).the dominant land use is residential with 1,179 houses within the defined regeneration area.

Issues within the area are complex and numerous including significant urban obsolescence, degeneration, vacancy and under-utilisation resulting in deterioration to the physical and social fabric of the area.

2.4.5 Physical Objectives

The LRFIP proposes different physical measures within each of the four regeneration areas as detailed in Table 2.2.

2.5 PLANNING HIERARCHY AND INTERACTION WITH OTHER PLANS AND PROGRAMMES

The Limerick Regeneration Framework Implementation Plan (LRFIP) has been prepared within

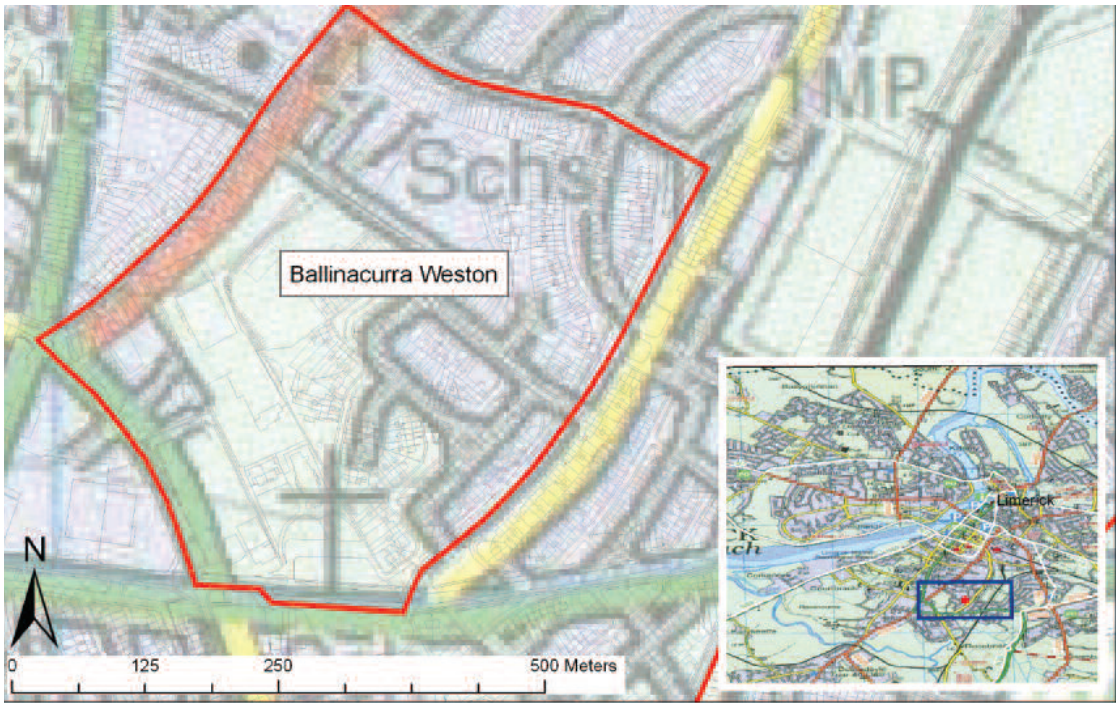

Figure 2.4 Defined Regeneration Area for Ballinacurra Weson

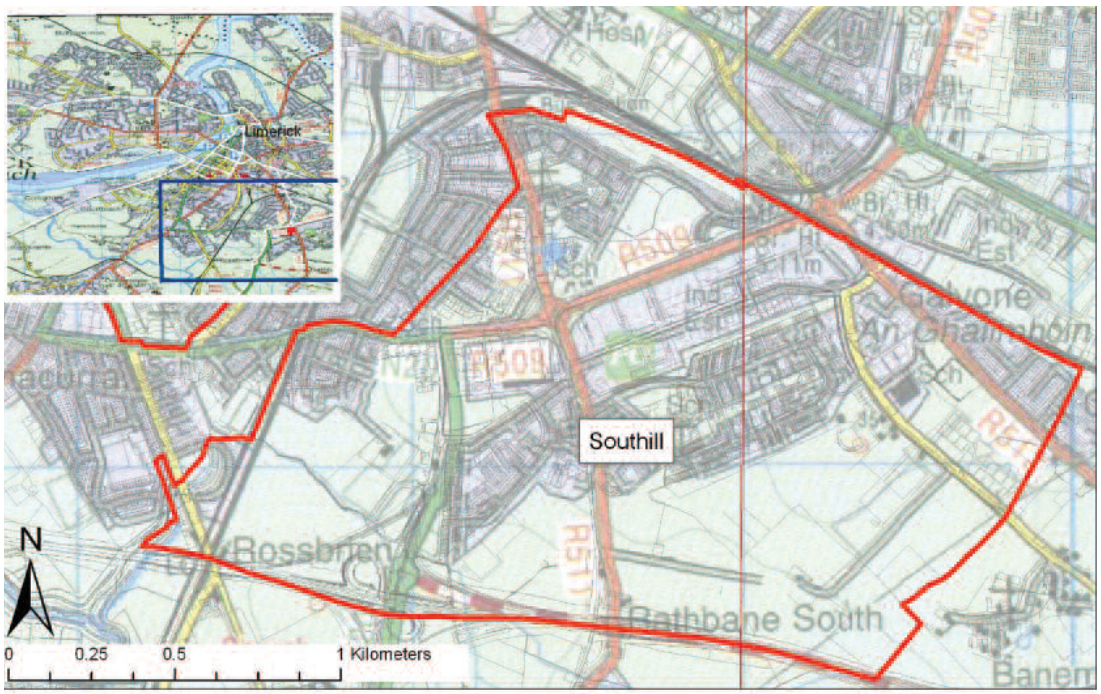

Figure 2.5 Defined Regeneration Area for Southill

2. Limerick Regeneration Framework Implementation Plan - A Context

the context of existing international, national, regional, and local level policy, strategy and guidance documents. It is intended that the LRFIP will act as a future blueprint for the (Limerick joint authority)

St. Mary's Park	Moyross	Ballinacurra Weston	Southill
Demolish 65 no. homes	Demolish 314 no. homes	Demolish 27 no. homes	Demolish 199 no. homes
Refurbish 321 no. homes	Refurbish 451 no. homes	Refurbish 205 no. homes	Refurbish 527 no. homes
Provide 49 no. replacement homes	Provide 295 no. replacement homes	Provide 40 no. replacement homes	Provide 209 no. replacement homes

Table 2.2 Specific Physical Measures in each Regeneration Area

Office of Regeneration and that it will form the basis for input into future policy at national, regional and local level, in particular the Limerick City Development Plan which controls and regulates development in the city through landuse planning and environmental policies.

The Limerick City Development Plan is part of a systematic hierarchy of land use and spatial plans, including the National Spatial Strategy and Regional Planning Guidelines. It is informed by the plans and strategies of the Government and other public agencies in general. Through the Planning and Development Act 2000, the following hierarchy of policy in relation to planning is established:

- National Development Plan (NDP);
- National Spatial Strategy (NSS);
- Regional Planning Guidelines;
- County, Borough and City Development Plans; and
- Local Area Plans.

The LRFIP represents lower level local planning and thus it is important that its framework sits comfortably within the hierarchy of existing policy as outlined above. Ultimately this LRFIP will feed into the forthcoming review of the Limerick City Development Plan 2010 – 2016. The extent and detail of the horizontal and vertical integration with other statutory and non-statutory plans and programmes is set out in Table 2.3 below. This is not an exhaustive hierarchical list of all plans and programmes but a structured consideration of the primary and directly relevant plans and programmes which have guided and influenced the LRFIP Plan at international, national, regional and local level.

2.6 PLANNING ENVIRONMENTAL AND COMMUNITY CONSIDERATIONS

The Office of Regeneration is committed to ensuring that all planning and development works is conducted according to all relevant legislation and accordingly applies a best practice approach to the planning and development of all regeneration programmes and works. There is a clear realisation that planning, environmental, economic and community considerations must be at the heart of all regeneration work managed and provided by the Office of Regeneration and that they are fundamental determinants in realising projects. This SEA and the Appropriate Assessment (AA) are the first steps in ensuring that an adequate Strategic Environmental Framework (SEF) is in place to guide future regeneration work.

Table 2.3 Interrelation with other Plans and Programmes

Level	Title	Relevance to LRFIP
International	Europe 2020	The LRFIP thereby draws on the Europe 2020 strategic framework of smart, sustainable and inclusive growth. The regeneration programme is a highly dynamic process heavily influenced through community involvement, the participation of public agencies, the availability of public funds and the statutory planning process. The programme therefore has significant cognisance of other funding programmes and spatial strategies.
	Leipzig Charter on Sustainable European Cities	Objectives seeks to ensure that all dimensions of sustainable development should be taken into account at the same time and with the same weight, including economic prosperity, social balance and a healthy environment. The Charter recognises that cities cannot fulfill their function unless holistic strategies and coordinated action which reach beyond the boundaries of individual cities are prepared. It also seeks to ensure that special attention is paid to deprived neighbourhoods within the context of the city as a whole.

Table 2.3 Interrelation with other Plans and Programmes *(Continued)*

Level	Title	Relevance to LRFIP
National	National Development Plan 2007 to 2013	Objectives of the NDP are to promote more balanced spatial and economic development. The aims of the LRFIP are very much in line with the aims of the Social Housing Provision and Renewal Sub Programme which seeks to deliver a greater quantity of social housing options and at the same time to improve the overall quality of this tenure. Thus in line with the NDP, the LRFIP commits to delivering high quality development in mixed community settings with proper attention to the planning and design of new housing to ensure that developments do not contribute to or reinforce social segregation.
	National Spatial Strategy 2002-2020 (2002)	Objectives of the NSS are to achieve a better balance of social, economic and physical development across Ireland, supported by more effective planning. It has identified a number of Gateway Cities including Limerick which are the focus for population and economic growth in their region. Some of the key aspects of the NSS which have influenced the LRFIP are the: • spatial structure set out in the strategy • role of Gateways and the need for critical mass; • role of linkages; • suggested range of policy responses to strengthen communities; and • the need for effective integration of land use and transportation policy
	Our Sustainable Future, a Framework for Sustainable Development for Ireland 2012	Objectives seek to guide social inclusion, sustainable communities and spatial planning in Ireland. Developing sustainable communities involves a range of social issues and this is a key guiding principle in the preparation and implementation of the LRFIP, which focuses as much on the social pillar as it does on the physical and economic pillars.
	National Guidelines	• Architectural Heritage Protection: Guidelines for Planning Authorities 2011 • Sustainable Residential Development in Urban Areas 2008 • Urban Design Manual – A Best Practice Guide 2008 • Quality Housing for Sustainable Communities 2007 • Sustainable Urban Housing: Design Standards for New Apartments 2007 • Landscape and Landscape Assessment: Guidelines for Planning Authorities 2000 • The Planning System and Flood Risk Management Guidelines for Planning Authorities 2009 • Appropriate Assessment of Plans and Projects in Ireland – Guidance for Local Authorities • Strategic Environmental Assessment Guidelines Housing Policy Statement 2011
	Delivering Homes Sustaining Communities 2007	Presents a vision of the future of housing up to 2027 to obtain more effective delivery in ways that ensure that individuals in need of support are offered options tailored to their needs. The document sets out a range of actions to achieve the vision and these actions have been considered in the preparation of the LRFIP in so far as they relate to urban design, housing design and quality. The document also influences the approach promoted in the LRFIP relating to tenure diversification and the support schemes available for social housing tenants seeking homeownership.
	Housing Policy Statement 2011	Approved housing bodies will be at the heart of the Government's vision for housing provision through the use of loan finance and without reliance on capital funding from the Exchequer. It refers to existing problems in urban centres such as Limerick and states that housing supports should be better aligned with broader supports for the physical, social and economic renewal and rebirth of these areas. The objective is to improve the quality of existing social housing stock through regeneration and improvement works programmes, and the return of vacant stock to effective use within the shortest timeframes possible. These are core objectives within the LRFIP which is fully aligned with the new policy direction outlines and shaped within the Housing Policy Statement 2011.

2. Limerick Regeneration Framework Implementation Plan - A Context

Table 2.3 Interrelation with other Plans and Programmes *(Continued)*

Level	Title	Relevance to LRFIP
Regional	Mid West Regional Planning Guidelines (RPG) 2010 – 2022	The RPG's identifies a 'Zone' based strategy for the region. Zone 1 which includes Limerick City is the core area of the region and one of the key requirements for this Zone as set out in the RPG's is to consider how residential development will be accommodated on brownfield and redevelopment sites as well as in greenfield locations. The LRFIP seeks to deliver on this key requirement by regenerating existing residential units and communities within the existing urban fabric and settlement.
	Draft Mid West Area Strategic Plan 2012	A strategic Planning, Land Use and Transportation Strategy, developed to provide a comprehensive integrated transport and land use plan in the Mid-West Region for the next 30 years. The plan stresses that the city must be an attractive place to live, work and visit. Quality of life is essential and in cities it is derived from the availability of employment; access to social, cultural and amenity facilities; good public transport and a well-planned living environment, including public realm, which is fit for purpose. The MWASP states that responding to this challenge, amongst other things, will require progress on the Regeneration Programme. It also refers to the importance of the Regeneration Programme in achieving population targets for the City and the need to support the development of "Central Limerick" relative to "Suburban Limerick".
	Limerick & Clare Joint Housing Strategy 2011 – 2017	Prioritises the Limerick/Shannon Gateway, followed by Ennis, as the primary locations in the region for residential development. The Strategy acknowledges that the NSS and RPG population targets are ambitious, particularly as there has been a sudden slowdown in housing output. The Strategy states that the Regeneration Programme in particular is critical to redirecting population growth into Limerick City. It finds that insufficient growth in the regeneration areas would have serious implications for the implementation of regional and national policy.
	Shannon International River Basin Management Plan	The Shannon IRBD Project was established to assist local authorities to implement the Water Framework Directive (WFD). The WFD requires all member states to protect and manage their water resources on the natural, geographic boundaries to maintain "high status" of waters where it exists; to prevent any deterioration in the existing status of waters and; to achieve at least "good status" in relation to all waters in the Shannon IRBD by 2015.
	Draft Shannon CFRAMS	The Office of Public Works (OPW) is working to deliver the CFRAM Study for the Shannon River Basin District (RBD) with a completion date of December 2015. The study will focus on areas known to have experienced flooding in the past and areas that may be subject to flooding in the future either due to development pressures or climate change. This draft plan is critical to the regeneration areas and in particular development proposals within St. Mary's Park which is subject to flooding.
	Retail Strategy for the Mid West Region 2010 – 201	Highlights that Limerick City Centre no longer performs to its Tier 1 Status in the shopping hierarchy and that if the city centre is not prioritised as a retail destination, it will accelerate the broader deterioration of the city. Limerick City Centre is in urgent need of comprehensive retail development to prevent further erosion of its retail position and stimulate the wider regeneration of the City.
	Mid West Climate Change Strategy 2012	The objective is to clearly identify the solutions to the challenge of reducing energy related emissions and to outline the actions to be taken to meet the requirements under the Kyoto Protocol. The strategy promotes residential energy performance over and above national targets to address the high emissions in the residential sector. These principles are promoted in the LRFIP particularly having regard to the planned physical regeneration framework which includes a substantial refurbishment programme.
	Limerick and Clare Sports and Recreational Strategy 2012	Seeks to coordinate the objectives and targets of key stakeholders in a cohesive and integrated plan for the area and to work together in ensuring the provision, management and use of quality facilities and services for everyone, including future generations. The strategy is sub regional and high level in its approach, and does not, therefore, focus on community based or community level facilities although it does recognise their importance. The provision of recreation and sports facilities is an integral part of the LRFIP and in this regard the LRFIP has adopted a 'lifecycle' approach to inclusively provide for all groups in society.

Table 2.3 Interrelation with other Plans and Programmes *(Continued)*

Level	Title	Relevance to LRFIP
Local	Limerick City Development Plan 2010 – 2016	The CDP seeks to support the implementation of the Regeneration Programme in a coordinated and sustainable manner and to co-operate with the Regeneration Agencies now the Office of Regeneration to deliver the goals and objectives set out in the Regeneration Programme (policy RG1). It also seeks to zone the regeneration areas in a flexible manner to facilitate the delivery of the master plans (policy RG.2). It highlights that the delivery of a much stronger social mix is paramount to the success and sustainability of the new housing estates in the regeneration areas. Whilst it acknowledges that the priorities shall differ for each of the areas it does request that a number of principles are incorporated into the LRFIP including the requirement for environmental assessments, economic strategies, permeability plans, design codes and sustainable energy initiatives. The LRFIP has been prepared having regard to these requirements.
	Limerick Economic Strategy and Spatial Implementation Plan	The strategy focuses on revitalising the heart of the city and prioritises a targeted set of strategic economic activities. Outside of the city centre it identifies key locations which would be suitable for IDA supported office-based employment centres. Whilst not directly impacting on the regeneration areas, the strategy does seek to enhance linkages and permeability throughout the city, linking it with the outer urban areas. The LRFIP has regard to this Plan in so far as it draws on its economic strategy and the overall direction of the city to influence future economic and social programmes and initiatives within the regeneration areas.
	Limerick City – Ireland's Smarter Travel Demonstration City 2012 – 2016	The city is due to receive funding of g9 million over the next five years to roll out a wide range of measures and interventions targeted at encouraging people to use more sustainable modes of transport and to engage in transport planning. Whilst it is acknowledged that car ownership within the regeneration areas is low and the use of public transport, particularly in Southill, is high, there still remains significant opportunities to not only further increase the numbers of people traveling on foot or using public transport, but also to reconnect the regeneration areas with the city. As a result the LRFIP has had strong regard to the proposed measures outlined under this programme.
	Limerick City Centre Strategy 2008	The strategy seeks to enhance and improve the city centre. Although the Regeneration Areas fall outside the scope of the defined 'City Centre' Limerick City Council recognises the necessity for clear co-ordination to ensure that the focus areas are clearly linked with the city centre. The LRFIP is focused on introducing measures to achieve not only greater permeability within the regeneration areas but also greater connectivity with adjoining areas and the city centre and has thus had regard to such relevant proposals within the City Centre Strategy.

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3. SEA Methodology

3.1 INTRODUCTION TO THE ITERATIVE APPROACH

This section details how the SEA has been undertaken alongside the preparation of the LRFIP. The SEA process started in February 2013. Figure 3.1 lays out the main stages in the LRFIP/SEA process. The LRFIP (prepared by the Office of Regeneration), the SEA Environmental Report (prepared by HRA | Planning) and the Appropriate Assessment (prepared by Openfield Ecological Services) were prepared in an iterative manner whereby multiple revisions of each document were prepared, each informing subsequent iterations of the others. To facilitate this iterative approach, numerous meetings were held between the Office of Regeneration and HRA | Planning and the Office of Regeneration and the Department of the Environment, Heritage and Local Governmant (DEHLG). The main changes to the LRFIP arising from both the SEA and Appropriate Assessment processes are detailed in Section 9.0 and Appendix 1 of this report.

An Appropriate Assessment (AA) under Article 6 of the Habitats Directive has been undertaken on the LRFIP. The requirement for AA is provided under the EU Habitats Directive (Directive 1992/43/EEC). The preparation of the LRFIP, SEA and AA have taken place concurrently and the findings of the AA have informed both the LRFIP and the SEA. Measures which have been integrated into the LRFIP which provide for the protection of ecological sensitivities – including Natura 2000 Sites have been developed by and alongside the AA process.

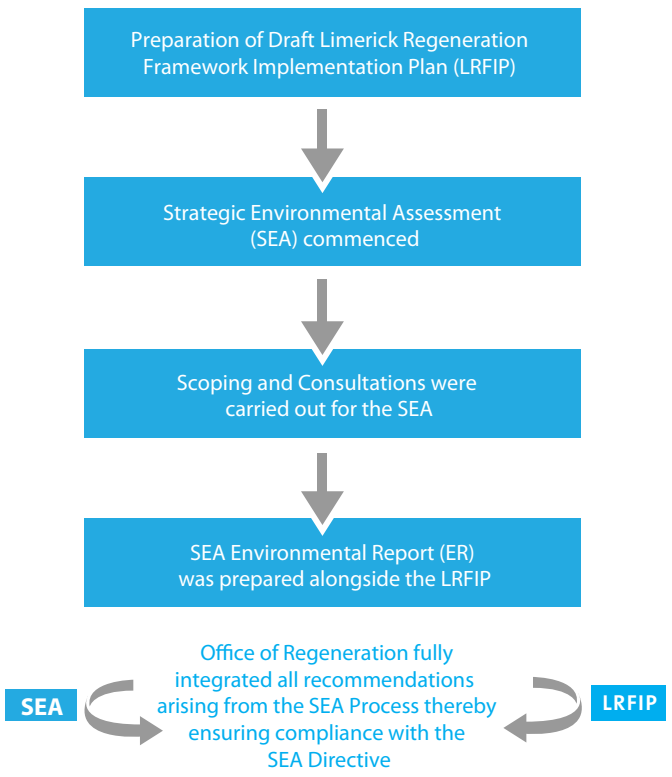

Figure 3.1 LRFIP and SEA Stages

3.2 KEY STAGES IN STRATEGIC ENVIRONMENTAL ASSESSMENT

Based on the requirements of legislation and guidance, the SEA has been carried out in the steps outlined in Table 3.1. This ER is an intermediary step in the SEA process; following consultation on the LRFIP and ER, the revised Plan and SEA Statement will be published.

Information Required to be included in the Environmental Report	Corresponding Section of this Report
(a) an outline of the contents, main objectives of the plan or programme and relationship with other relevant plans or programmes.	Section 2.0
(b) the relevant aspects of the current state of the environment and the likely evolution thereof without the implementation of the plan or programme.	Section 4.0
(c) the environmental characteristics of areas likely to be significantly affected.	Section 4.0
(d) any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC.	Section 4.0
(e) the environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation.	Section 5.0
(f) the likely significant effects on the environment, including on issues such as biodiversity, population, human health, fauna, flora, water air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage landscape and the interrelationship between the above factors.	Section 8.0
(g) the measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects strategy on the environment of implementing the plan or programme	Section 9.0
(h) an outline of the reasons for selecting the alternatives dealt with and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information	Section 6 and Section 7.0
(i) a description of the measures envisaged concerning monitoring in accordance with Article 10	Section 10.0
(j) Non technical summary of the above information	At beginning of Report

Table 3.1 Checklist of Information Included in this Environmental Report

3.2.1 Scoping

In consultation with the relevant authorities, the scope of environmental issues to be dealt with by the SEA together with the level of detail to which they are to be addressed was broadly decided after preliminary collection of environmental baseline data. Scoping of the SEA was concurrent with certain issues being selected for further examination after certain data was obtained. Scoping allowed the SEA to become focused upon key issues, such as those relating to existing and potential environmental issues and environmental problems. Scoping facilitated the selection of issues relevant to the environmental components which are specified under the SEA Directive – biodiversity, fauna, flora, population, human health, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage and landscape.

SEA scoping notices were sent to the Environmental Protection Agency, the Minister for the Environment, Community & Local Government; the Minister for Agriculture, Marine and Food; the Minister for Communications Energy and Natural Resources; the Minister for Arts, Heritage and Gaeltacht Affairs; Limerick County Council; and Limerick City Council. A Scoping Report which included a brief outline of the likely content of the LRFIP was also issued.

A written submission on the scope of the SEA was received from the EPA dated 10th May 2013. This submission highlighted four main points including:

- Consideration should be given to ensuring that key significant higher level Plans such as the Shannon International River Basin Management Plan (and associated Programme of Measures), Mid-West Regional Planning Guidelines and the Draft Shannon CFRAMS are integrated into the Plan.
- The Plan in particular should ensure that land use / development are appropriate to the level of flooding identified. Vulnerable land uses (such as residential) should be avoided in areas of significant flood risk (Flood Zones A & B). The Flood Risk Management Guidelines should be fully integrated as appropriate into the preparation of the Plan.
- The Plan should also provide for the protection of designated conservation sites of national and international importance (NHA's and Natura 2000 sites) adjacent to the Plan area. The protection of key ecological linkages / corridors should also be incorporated into the Plan.
- The Agency's previous submissions in relation to the Moyross Framework Plan & Implementation Report (26th May 2011) should also be taken into consideration in the preparation of the Plan as issued raised in this Plan may be also relevant and should be taken into account

A written submission was received from Limerick City Council on the 22nd May 2013 clarifying the following points:

- The LRFIP will be incorporated into the Limerick City Development Plan by way of a variation.
- The extent of demolition work proposed will need to be carefully addressed given the scale of demolition work already taken place.
- Flooding in Kings Island will need to be carefully considered.
- Kings Island and Moyross should be treated in as much as possible as a single entity

The information provided in the written responses to the SEA scoping notice by environmental authorities and the information provided at meetings with these authorities was taken into account during the preparation of the Environmental Report and throughout the process to date.

3.2.2 Environmental Baseline Data

The SEA process is informed by the environmental baseline (i.e. the current state of the environment) to facilitate the identification and evaluation of the likely significant environmental effects of implementing the provisions of the LRFIP and the alternatives and the subsequent monitoring of the effects of implementing the provisions of the LRFIP as adopted.

The methodology and sources used to gather baseline information to develop Environmental Protection Objectives, targets and indicators and to complete the environmental assessment are detailed at the beginning of the relevant subsections in Section 5.0 of this report.

3.2.3 Alternatives

The SEA Directive requires that reasonable alternatives (taking into account the objectives and the geographical scope of the plan or programme) are identified, described and evaluated for their likely significant effects on the environment. The Office of Regeneration, Limerick City Council as the authority responsible for regeneration, was obliged to consider alternative ways of achieving the regeneration objectives of the four identified areas in Limerick city. SEA involves a systematic and explicit appraisal of alternatives. For the purposes of the preparation of the LRFIP, three possible realistic alternatives were identified, described and tested against the environmental protection objectives. These three alternatives are as follows:

- Continue to work with the two separate masterplans prepared for the Northside and Southside in 2008
- Do not prepare a LRFIP and work under the existing statutory provisions of the Limerick City Development Plan 2010 – 2016
- Develop a framework for effective regeneration of the four identified areas in accordance with the proper planning and sustainable development of Limerick city.

The alternatives were considered reasonable, realistic and capable of implementation and are considered in further detail in Section 6.0.

3.2.4 The SEA Environmental Report

In this ER the likely environmental effects of the LRFIP and the alternatives are predicted and their significance evaluated. The Environmental Report provides the Office of Regeneration as well as the public with a clear understanding of the likely environmental consequences of decisions regarding how regeneration works will be implemented and delivered.

Mitigation measures to prevent or reduce significant adverse effects posed by the LRFIP are identified in Section 9 and these have been integrated into the LRFIP.

3. SEA Methodology

It may be necessary to alter this ER following public consultation in order to take account of recommendations contained in submissions and in order to take account of changes which were made to the draft LRFIP on foot of submissions.

3.3 DIFFICULTIES ENCOUNTERED

Annex I (h) of the SEA Directive requires the identification of any difficulties encountered in compiling the information required by the assessment. There exists a considerable variation in city level environmental information. Whilst certain information is readily and easily accessible, such as data relating to water quality, other information is more difficult to ascertain or is not yet available.

The following subsections identify the difficulties encountered during the process which had to be overcome.

3.3.1 Flooding Data

There is a lack of substantive flooding data within the four regeneration areas. At this point in time there are no Catchment Flood Risk Assessment Studies (CFRAMS) and no modelling reports on flood risk assessment for the LRFIP area. However it is understood that a draft CFRAMS may be available in 2014. As stated in the Limerick City Development Plan "until such time as comprehensive information and guidance is available on flooding in the City, a flexible approach is required to take account of flood risk to ensure that appropriate measures are taken wherever the need arises".

In the absence of such comprehensive data, information from a variety of sources has been amalgamated to provide a single indicative flood extent map for the city including the regeneration areas. Furthermore a detailed Flood Risk Assessment was undertaken for St. Mary's Park regeneration area to inform the SEA and overall housing strategy approach for the area.

3.3.2 Water

With regard to the availability of data for the monitoring of indicators (see also Section 10 Monitoring) it is noted that Indicator W2 (Groundwater Quality Standards and Threshold Values under Directive 2006/118/EC) is to be sourced from the EPA; however, data may not be available for the preliminary monitoring evaluation as the groundwater threshold values to which this indicator relates have not yet been identified by the EPA.

3.3.3 Noise

No independent data on noise levels in the area affected by the LRFIP is available at national or local level. It is however assumed that noise levels are at their highest closest to heavily trafficked areas. Whilst the LRFIP is unlikely to have a significant impact on noise levels, enhanced road improvements and connectivity may lead to a greater increase in traffic whilst more attractive urban areas and open spaces are likely to lead to an increase in numbers using such facilities. However such increases are considered to be negligible in the context of a busy urban city environment.

3.3.4 Information on Regeneration Effects to Date

There is a significant gap in information relating to the impacts of regeneration works undertaken to date. Significant regeneration works have been undertaken since 2008 within the four regeneration areas. Works undertaken relate to demolition of housing, refurbishment and new build housing, provision of services and infrastructure and community support networks. However, due to the lack of monitoring there is little information available on the impacts of such works on the regeneration community and on the wider city. Although such information is not presently available, it is considered that the monitoring required under SEA will provide much valuable information in the assessment of the existing and future projects.

4. Environmental Baseline

4.1 INTRODUCTION

This section provides a description of environmental components which have the greatest potential to be affected by implementation of the LRFIP. Ecology and water were determined during the SEA scoping process as environmental components most at risk of potential negative impacts arising from implementation of the LRFIP. Consequently these environmental components are considered in greater detail than other components. For parts of the baseline descriptions of the environmental components the study area has been broken into four distinct areas including:

- St. Mary's Park,
- Moyross,
- Ballinacurra Weston, and
- Southill

4.1.2 Evolution of the Environment

The principal forces that are currently changing the environment of the island of Ireland are urbanisation, agricultural reform and environmental regulation. These are causing different changes in different areas. Urbanisation is rapidly increasing in all parts of Ireland as more and more people reside within the environs of established settlements and their environs. Whilst the Reform of the Common Agricultural Policy does not directly impact on the study area, environmental regulations that seek to protect the status of vulnerable and significant habitats and waters is a significant issue particularly on Kings Island and in St. Mary's Park.

4.1.3 Likely Evolution of Problems in the Absence of the LRFIP

In the absence of a planned and environmentally sensitive programme for regeneration there would be no coordinated response to the physical, social, community safety and economic problems within the communities and it is likely that the quality of life of individuals currently residing in those areas would not improve. An integrated approach to development would not be supported and it is likely that physical improvements would proceed with little integration into the wider socio economic improvements that are required to support the wider population. Physical improvements to the area would be facilitated on an ad hoc basis and it is likely that increasing conflicts with environmental designations and flooding constraints on Kings Island would arise. However there would also be fewer new projects with potential environmental effects such as those identified throughout Section 8 of this report.

4.1.4 Likely Evolution with Proposed LRFIP and SEA

The SEA has been undertaken in order to anticipate and avoid adverse impacts arising from the LRFIP. This will facilitate the development of the strategy outlined in LRFIP in a sustainable way that will ensure that such development will be conceived and delivered having regard to the carrying capacity of the receiving environment.

4.2 BIODIVERSITY AND FLORA AND FAUNA

Though the regeneration areas are located in primarily urban and developed habitats, some aspects of the study areas support and are located adjacent to a diversity of natural and semi natural habitats which support a diversity of habitat types and species some of which attract the benefit of legislative protection or which provide important local biodiversity features supporting common features and species.

4.2.1 Nature Designations

Sites designated for nature conservation comprise sites of European and National importance. The Habitats Directive (Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora) has been transposed into law by the European Communities (Birds and Natural Habitats) Regulations 2011(SI 477 of 2011). Member States must establish an ecological network of Special Areas of Conservation (SAC) under the Directive. The network (Natura 2000) is composed of sites hosting a range of natural habitats and species listed in Annex I and II of the Directive but also includes Special Protection Areas designated under the Birds Directive. Additional information on Natura 2000 sites is provided in the Natura Impact Report (NIR) report which accompanies the LRFIP and this Environmental Report.

To date, several desktop and baseline ecological surveys and draft Natura Impact Report (NIR) (habitats directive assessments) have been collated and undertaken for previous regeneration objectives in each of the four areas in 2010 and 2011. These studies have recognised the proximity of the Moyross and St. Mary's study areas to the internationally and nationally designated areas of ecological conservation value including;

- Natura 2000 site 'Lower River Shannon candidate Special Area of Conservation' (SAC site code No. 2165) and;
- the national designation – 'Knockalisheen Marsh proposed Natural Heritage Area' (site code No. 2001).

The Lower River Shannon, Special Area of Conservation (SAC) (code 002165) is designated under the EU Habitats Directive and covers the River Shannon and an adjacent strip of riparian woodland and reed-swamp along its fringe. St. Mary's Park located on the Shannon/Abbey River within a tidal estuary has a strip if riparian woodland that fringes almost the entire island and falls within the SAC designation. On the island's western shore this fringe is narrow and in some places there is open grassland. However on the eastern shore it is much more developed and uninterrupted. Comprising approximately 10 hectares of woodland, this is an example of the Annex I priority type Alluvial forests and is one of the rarest native woodland types in Ireland. It is of high biodiversity value and home to a range of woodland species as well as being vital for the preservation of water quality and the prevention of bank erosion.

The SAC designation also encroaches into the Moyross regeneration area including a small triangle of wetland habitat immediately north of Watch House Cross on the eastern boundary and an extensive area of wetland to the north. These areas in Moyross also fall within the Knockalisheen Marsh (code 002001) designated as a proposed Natural Heritage Area (pNHA). The site consists of grassland that slopes gradually to a wetland area consisting of wet grassland and fen communities which are considered species rich which then drains into the River Shannon. The nature designations are detailed in Figure 4.1.

4. Environmental Baseline

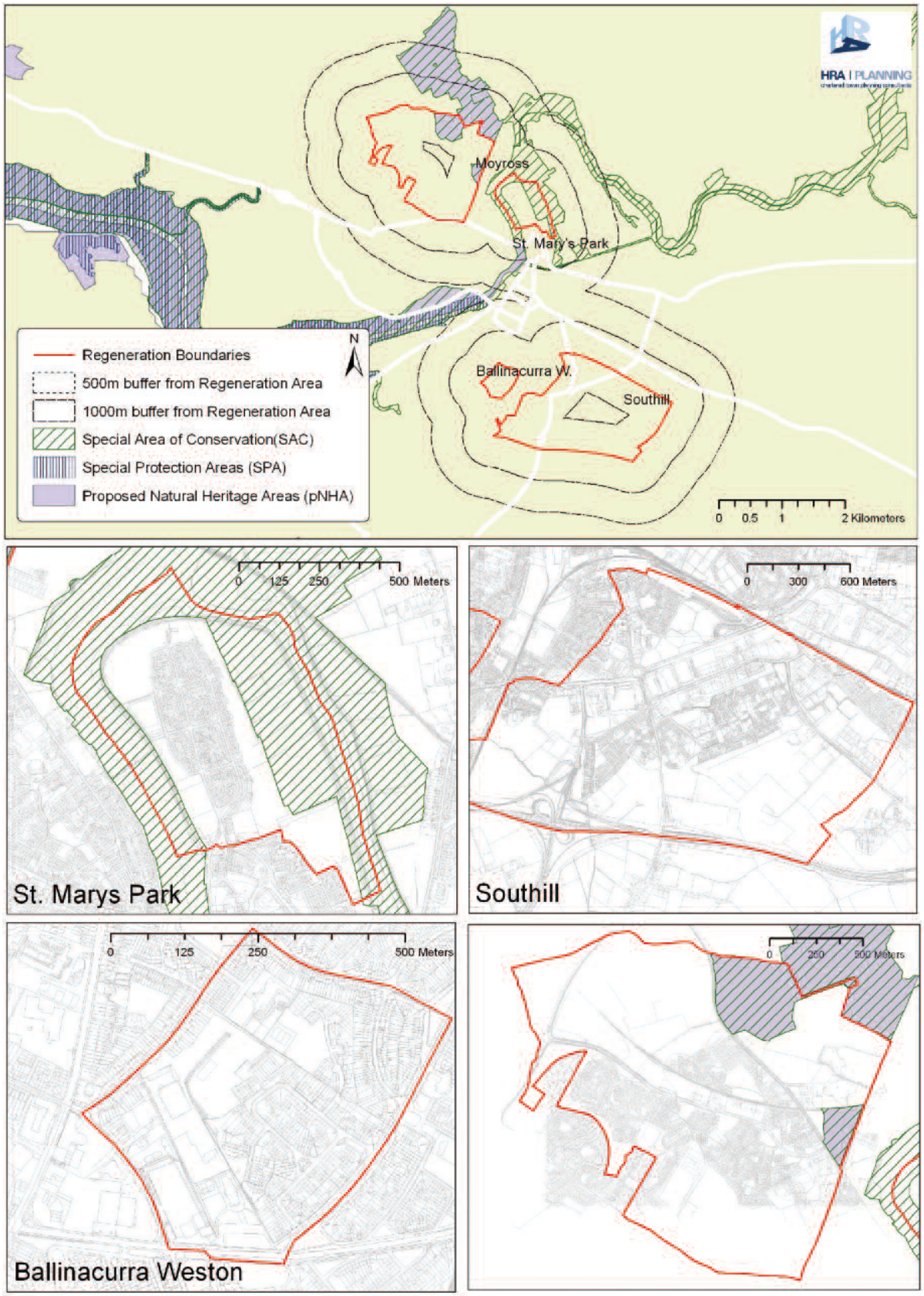

Figure 4.1 Nature Designations

4.2.2 Biodiversity

In addition to these designated habitats there are also a number of other semi-natural habitats of local biodiversity value within each of the four regeneration areas. The Limerick City Bio-Diversity Plan, by raising knowledge about habitats, within the city area and with recommendations for everyday actions to conserve bio diversity is a useful reference point in retaining natural environments within the city area.

St. Mary's Park

St. Mary's Park is characterised by residential development in the central core of the island with undeveloped greenfield land and woodland dominating the outer peripheral area where it adjoins the river. Much of the undeveloped land comprises fresh water wetland which floods in winter and slowly drains during spring and summer. Much of the wetland environment is largely artificial, as it is the flood embankments around the site that prevent water from draining away.

Moyross

Moyross forms part of a suburban residential setting but also comprises a vast expanse of undeveloped greenfield land. The grassland areas within Moyross are heavily grazed and are species poor in composition. The scrub-woodland areas are comprised of willow, blackthorn, hawthorn and elder with briar. The main area of scrub-woodland in the north central part of the study area is elevated above the surrounding ground by several metres and is surrounded by the SAC to the north, east and west. A deep drain extends from the wetland area north of the railway line westwards to the edge of Knockalisheen Marsh. To the south of the Knockalisheen Road the entrance to Castle Park Estate has a swathe of mixed broad-leaved woodland that extends up to and around the derelict house, while two linear belts run along the Knockalisheen road north and south.

Ballinacurra Weston

Ballinacurra Weston comprises a suburban residential setting with the result that its biodiversity is very much restricted to trees and natural hedgerows. The most significant tree groups occur at different intervals to the north of the area, particularly to the

rear of Adapt House and to the rear of Beechgrove Estate. Given the lack of existing natural landscape within the regeneration area it would be desirable to protect and enhance any existing features.

Southill

Southill primarily comprises a suburban residential setting with the Rathbane municipal golf course included within the regeneration boundary area. Given the urbanised nature of the area its biodiversity is very much restricted to trees and natural hedgerows. Southill House Demesne located along the Roxboro Road contains significant mature tree groups consisting of Holm's Oak, Elm trees, Sycamore, Yew and some hawthorn and holly with evidence of a rookery creating a scenic landscape. Smaller clusters or bands of trees are noted at other locations within Southil, at the primary school by O'Malley Park, the boundary of the Golf Course, St. Enda's School, and at the eastern end of the Galvone Industrial Estate. Given the lack of existing natural landscape within the regeneration area it would be desirable to protect and enhance any existing features.

4.2.3 Existing Environmental Issues relating to Biodiversity, Flora & Fauna

The potential threats to the management of biodiversity, flora and fauna within the LRFIP areas may appear limited given the already urbanised nature of the land and having regard to the significant infill and redevelopment programme proposed on existing brownfield land. Nonetheless the following broad range of issues has been identified:

- Facilitating balanced development having regard to specific recreational, heritage and biodiversity needs (interaction with population, human health, cultural heritage);
- Protecting designated areas and sites including the Natura 2000 site 'Lower River Shannon candidate Special Area of Conservation' (SAC site code No. 2165) and; the national designation – 'Knockalisheen Marsh proposed Natural Heritage Area' (site code No. 2001);
- Protection of areas or sites of high biodiversity quality not designated at national or EU level;
- Maintaining and enhancing biodiversity in the area particularly at a local level;
- Promoting multifunctional use, community access and use of green spaces and links to compliment walking and cycle routes;
- Exploiting the Green Infrastructure potential of environmental areas and features within and adjoining the plan area particularly near parks, the Shannon River and other waterbodies;
- Ensuring biodiversity interests taken into account in earliest stages of planning and development proposals;
- Creating, maintaining and protecting ecological corridors to maintain biodiversity; and
- Improving water quality and the enhancement of the biological diversity of the River Shannon and other minor watercourses.

4.2.4 Non-Implementation of the LRFIP

A non-implementation of the LRFIP would potentially have a negative impact on biodiversity in the area. While the Limerick City Development Plan 2010 - 2016 includes policies for the protection and enhancement of biodiversity, these are more strategic in nature and at a higher level. However, the LRFIP sets out the detailed framework to guide regeneration and the integration and creation of parks and amenity spaces is a key priority. The LRFIP includes a number of area specific measures which will enhance biodiversity value. In the absence of this LRFIP and its proactive polices and objectives, it is likely that further loss and degradation of habitats would occur. Furthermore, the survival of individual species of flora and fauna would also be threatened.

4.3 WATER

The potential for significant impacts on the water as an environmental variable and as a natural resource are diverse throughout the study area given the diverse nature of the water environment, water infrastructure and natural water resources and the clear 'path to receptor' interactions that could occur as a consequence of urbanised development objectives sought by the LRFIP Furthermore, aspects of the study area (pertaining to St. Mary's and Moyross) are positioned within defined Flood zones A and B as defined in the Limerick City Development Plan (areas prone to flooding mapping).

Potential impacts on the status of water bodies could include water resources and quality (ground/ surface water quality impairment, interference with watercourses and associated wildlife). There are also issues with controlling site drainage to ensure sedimentation of watercourses does not occur, in particular with regard to underground construction.

4.3.1 Water Quality

The Water Framework Directive (WFD) 2000/60/EC 'establishes a framework for community action in the field of water policy' and was transposed into Irish Law in 2003. The Directive aims at maintaining and improving the aquatic environment in the European Community. The overall objective of the Directive is to prevent deterioration in the status of any waters and achieve at least 'good status' by 2015. The WFD requires the preparation of a management plan for all the waters in an area called a River Basin District (RBD). For the purpose of implementing the WFD, some 400 river basins on the island of Ireland have been divided into 8 RBDs. The management of water resources will be within these RBDs.

The Shannon International River Basin District is one of the eight river basin districts established in Ireland arising out of the legal requirements of the Water Framework Directive. The Lower River Shannon flows alongside St. Mary's Park and runs adjacent to Moyross. As detailed in the SRBD, the pressures on the River Shannon have been identified as high nutrients, oxygen demand. The main causes can be attributed to agriculture, wastewater and industrial discharges, due to misconnected foul sewers, combined sewer overflows and urban area pollution. The implementation of the programme of measures developed as part of the River Basin Management Plan is aimed at achieving improvements to the existing moderate status of the water body.

The water quality of the River Shannon surveyed by the EPA, using a biological assessment method, is regarded as a representative indicator of the national status of such waters and reflects any overall trends in conditions. The data is collected on a three year cycle with the latest such period ending in 2009. Meelick Bridge is the closet testing point to the west of Moyross and classifies the waters at this point as good (Q3).

4. Environmental Baseline

4.3.2 Groundwater

Groundwater resources are important because of their potential use for drinking and as a vital component in surface water systems. Groundwater can be retained for short periods (days) to extremely long periods of time (1,000's of years) below ground level. Consequently ensuring that this valuable resource is protected from pollution is paramount in the interests of sustainability and the future needs of generations to come. The quality of groundwater depends on the surrounding geology which influences the chemical characteristics of the water. Human activities can also contribute to the chemical characteristics in a negative manner through inappropriate land uses.

Groundwater quality is protected under the requirements of the Water Framework Directive (2000/60/EEC). Groundwater vulnerability within and surrounding the LRFIP area is shown on Figure 4.2 ranging from "High to Low" with some "Extreme" small pockets. In St Mary's Park a band of extreme vulnerability existing on the north eastern boundary adjoining the River Shannon whilst in Moyross such a pocket exists to the north and northeast of the study area where rock is near the surface. An "Extreme" pocket in Ballinacurra Weston exists to the north-east of the study area, near the Adapt House complex, whilst in Southill some extreme pockets exist to the north and northeast of the study area.

4.3.3 Water Supply

Sourced from the River Shannon, some 11,388,000m3 of all drinking water, produced annually by Limerick City Council at the Clareville treatment plant in Castleconnell, is delivered to Limerick City. The treatment plant has undergone significant refurbishment and upgrade works in recent years at an investment cost of in excess of g26m. In addition to the treatment of water there is also an ongoing programme of leakage detection and repair in an effort to promote water conservation.
The water supplied by Limerick City Council consistently passes the water standards set by the European Drinking Water Directive of 1998 and must be in compliance with the European Communities (Drinking water) (No 2) Regulations 2007 (S.I 278 of 2007). Water quality may be affected from a number of different sources including flooding, increased

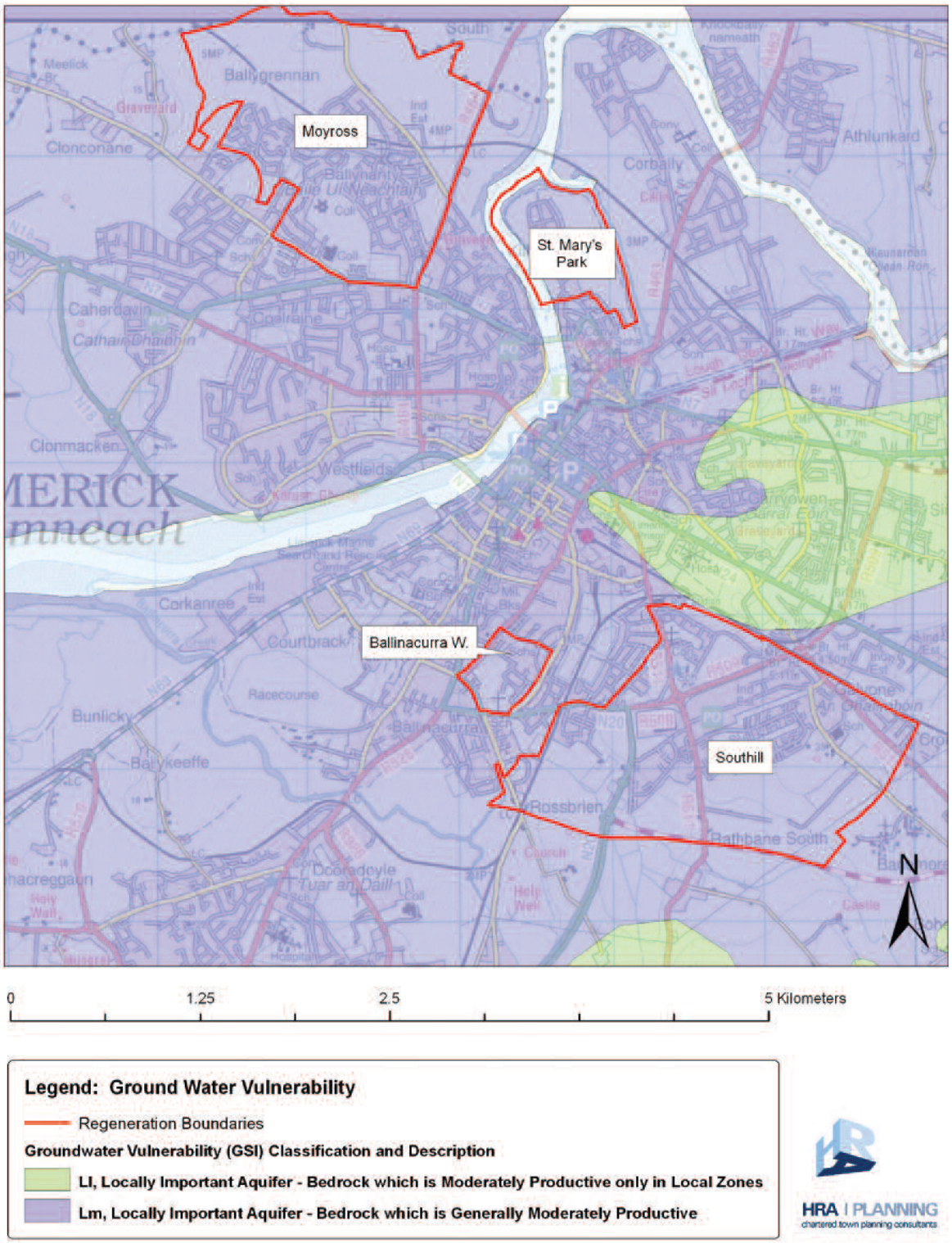

Figure 4.2 Groundater Vulnerability Source: GSI

runoff form agricultural or residential development, a breakdown in treatment process, power outages, lack of proper filtration or disinfection equipment, and sometimes poor water quality is due to the water being drawn from an unsuitable source.

Limerick City Council laboratory staff complete over 25,000 tests per year ensuring that drinking water quality is of sufficient standard whilst independent checking is also carried out by the Health Service Executive and the Environmental Protection Agency (EPA) (see figure 4.3 for water sampling points in Limerick City).

The EPA produces a yearly report on the quality of drinking water in Ireland and its most recent report in 2010 made the following assessment of the monitoring and quality of the water supply in Limerick City:

- Microbiological compliance levels in the Limerick City PWS were 100% in both 2009 and 2010 whilst chemical compliance levels have increased from 99.7% in 2009 to 99.8% in 2010.
- Two fluoride non-compliance notices were issued due to elevated levels of fluoride above the Irish standard. However, all samples were below the EU fluoride standard of 1.5 mg/l.
- No boil water or water restrictions notices were issued to consumers during 2010 and none remained active from previous years.
- The remedial works in the Clareville water treatment plant were completed to the satisfaction of the EPA in 2010 and therefore the Limerick City supply was removed from the remedial action list.

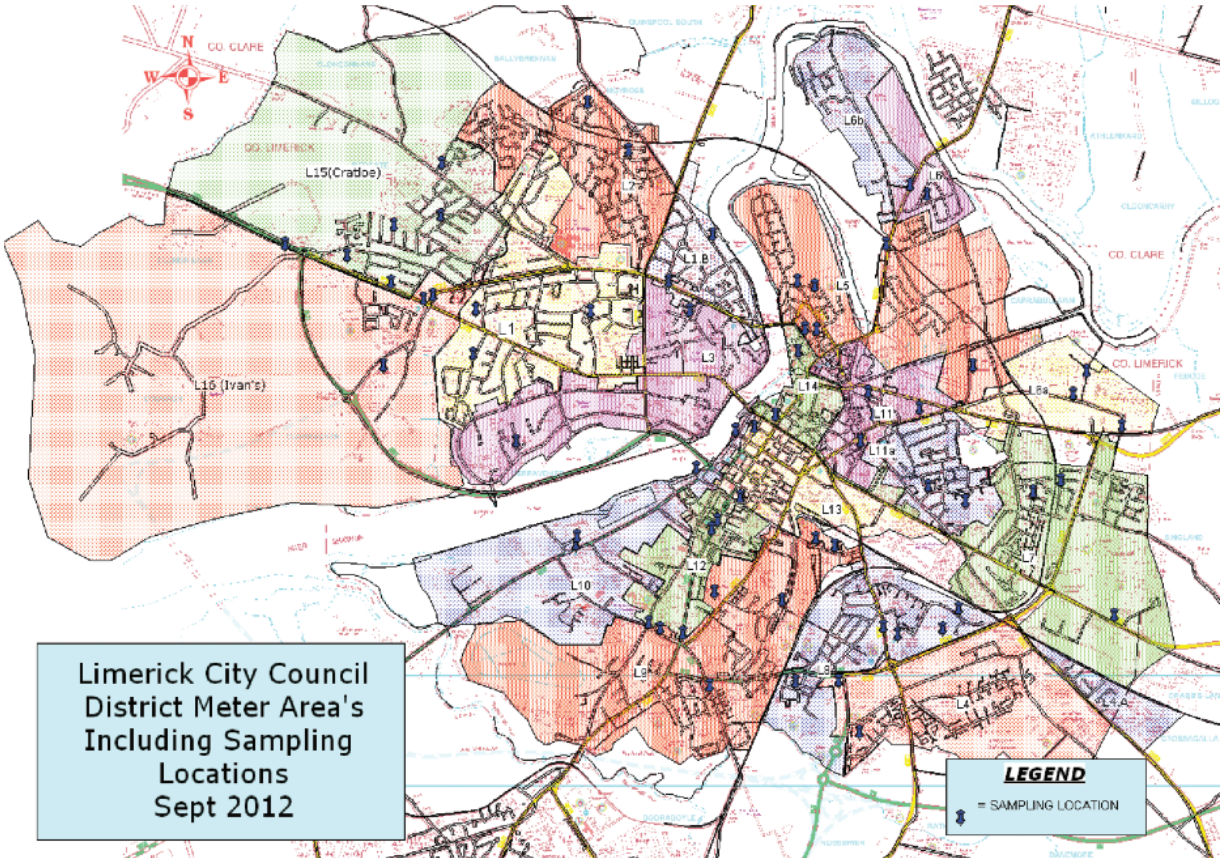

Figure 4.3 Water Sampling Locations Limerick City

4.3.4 Wastewater Network and Treatment

The EU Directive on Urban Waste Water Treatment, requires that urban areas exceeding 15,000 population equivalent, and located on estuaries, be provided with a treatment plant to at least secondary treatment standard. It further requires a collection system, designed to prevent untreated discharges into receiving waters, and that the discharge of the treated effluent meets all relevant directives and national standards. The Limerick Main Drainage Scheme is a significant piece of environmental infrastructure which ensures that the EU requirements for the provision of waste water treatment facilities are now being achieved in the city.

The city drainage infrastructure covers some 30km2 inclusive of the regeneration areas with each household generating on average 150-250 gallons of wastewater per day. The current population equivalent (p.e.) of the agglomeration serviced by the WWTP is given as 110,000 and with a design capacity of 130,000p.e. resulting in adequate capacity to absorb future development. With the recent construction of c.45km of large diameter interceptor sewers and the associated WWTP, untreated discharges to the Shannon and Abbey Rivers from Limerick city has been eliminated. The g300 million investment has improved river water quality in the whole area, from Parteen in Co. Clare to the Shannon Estuary.

The WWTP comprises preliminary (screening and grit removal), primary (settlement and biological aeration tanks) and secondary treatment (settlement clarifiers). The sludge from the WWTP and other imported sludges from WWTPs (7,000m3 in 2007) are dried on the Bunlicky site with a small volume of liquid re-circulated to the front end of the WWTP. Under the Waste Water Discharge (Authorisation) Regulations 2007 (S.I. 684 of 2007) wastewater discharges above a certain threshold will have to be licensed by the EPA. The licence which was issued to Limerick City Council by the EPA sets out in detail the conditions under which Limerick City Council will control and manage the waste water discharges from the city and surrounding area.

4. Environmental Baseline

4.3.5 Flood Risk

Flooding is a natural process that can happen at any time, in a wide variety of locations. The two main types of flooding potentially affecting the study area are from (i) coastal flooding which arises from the sea or estuaries; and (ii) fluvial flooding which arises from rivers or streams.

In addition to the River Shannon there are a number of tributaries running through the study area the most significant of these being a sub-tributary of the Ballinacurra Creek, which cross the south western corner of the Southill Regeneration Area. There have been a number of instances of fluvial flooding in Limerick City centre. The OPW maintains a register of fluvial flood reports (www.floodmaps.ie) and confirms that the most recent of these events occurred in 1999, 2002 and 2009.

Given the presence of tidal sections of the Abbey and Shannon Rivers in the city and within the regeneration areas, coastal flooding must also be considered. The highest predicted astronomical tide in the Shannon Estuary is 5.7m Chart Datum (2.67 m Malin) . Whilst it is clear that the regeneration areas do not flood during these high astronomical tides, it is noted that predicted tide levels often differ from observed tide levels due to weather conditions particularly storm surges.

Flood mapping prepared by Limerick City Council in the preparation of the Limerick City Development Plan places much of Limerick city centre and some outer lying areas in Flood Zone A (at risk in a 1 in 200 year coastal flooding event). Figure 4.4 provides information on two main areas of flood risk including Zone A where there is a high probability of flooding, and Zone B where there is a moderate probability of flooding. This information is represented at a larger scale in Figures 4.5 – 4.9. As previously referenced this map is likely to be refined in the future as more detailed data becomes available, particularly through the CFRAM programme.

Indicative data at this stage would suggest that the extent of potential flooding in St. Mary's Park may not be as severe as is currently represented and that a significant area of existing housing may in fact be located in Flood Zone C with the outer lying areas remaining in Flood Zone A. This emerging data has been used as it represents more accurate information based on available level data sourced from two LiDAR (DTM) datasets as captured for the Irish Coastal Protection Strategy Study undertaken several years ago and then more recently for the CFRAM Programme. Figure 4.6 shows the 5m and 5.5m contours as they relate specifically to St. Mary's Park. The 200 year (Zone A) level at the most upstream node out in the Shannon estuary is approximately 4.6m, while the 1000 year (Zone B) level at the same node is approximately 5m. The 5m and 5.5m contours on Figure 4.6 would therefore, based on this assumption, approximate to the Zone A and Zone B extents respectively.

The predominant flood threat to the regeneration areas lies in the area of St. Mary's Park and arises from coastal flooding associated with the River Shannon and Abbey River. While fluvial flooding has occurred in and around Limerick City in the past, higher flood levels have been noted in the Limerick area from storm surges. It is considered that a tidal storm surge is the dominant critical flooding mechanism for the Limerick City area including the regeneration areas and in particular St. Mary's Park.

St. Mary's Park

With reference to Figure 4.5 which is the defined flood extent as per the Limerick City Development Plan, St. Mary's Park regeneration area is completely located within Flood Zone A with the exception of a small island located within the St. Mary's Park housing estate footprint. With reference to Figure 4.6 and the most up to date information available and their assumed flood extents pending publication of CFRAMS, the small island becomes significantly larger although a large proportion of the regeneration area still remains in Flood Zone A.

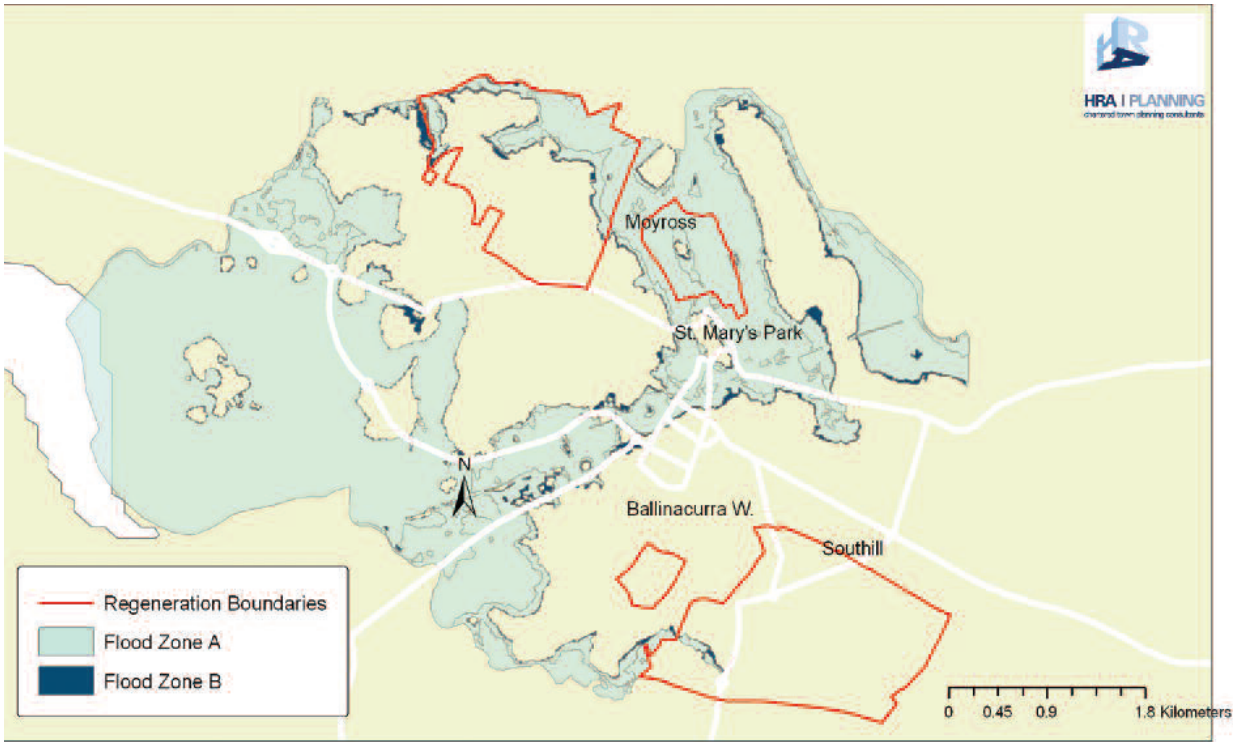

Figure 4.4 Extent of Potential Flooding in Limerick City including the defined Regeneration Areas

4 Source: Flood Risk Assessment for St. Mary's Park - Punch Consulting Engineers, 2013

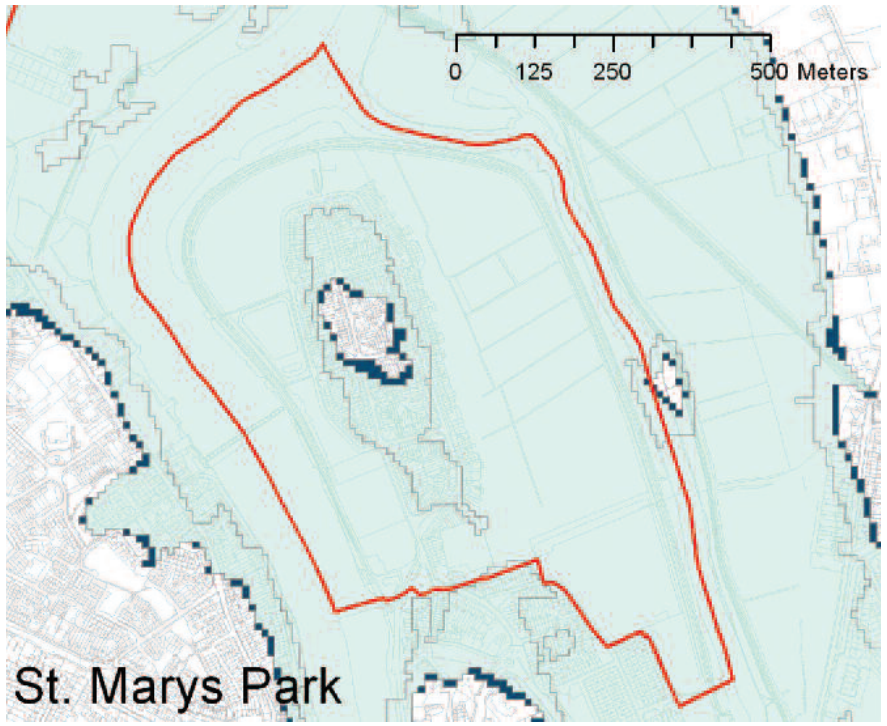

Figure 4.5 Extent of Flooding in St. Mary's Park as per information contained in the Limerick City Development Plan

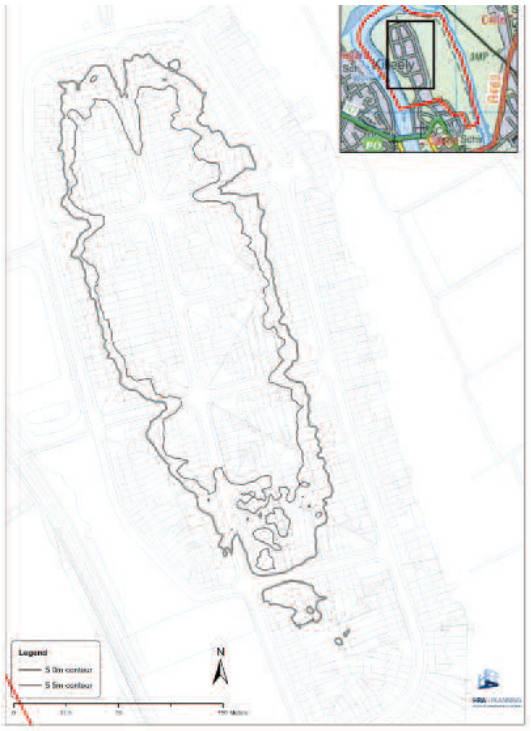

Figure 4.6 Extent of Flooding in St. Mary's Park using most up to date information available and their assumed flood extents pending publication of CFRAMS.

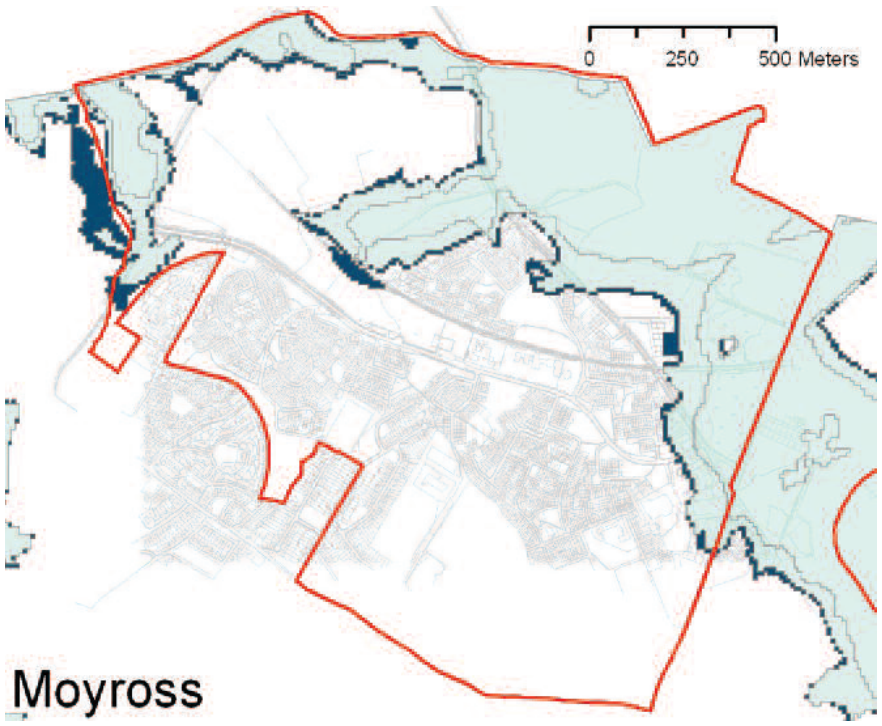

Figure 4.7 Extent of Flooding in Moyross as per information contained in the Limerick City Development Plan

Moyross

A significant extent of the regeneration area within Moyross falls within Flood Zone A. A precautionary approach has been adopted in accordance with the Guidelines and future development works within Moyross avoids areas at risk of flooding. Thus it is not proposed to provide for any replacement / new build dwellings within the flood zone with all undeveloped areas within the flood zone remaining as either open space or a greenfield site.

Ballinacurra Weston

The Ballinacurra Weston regeneration area is located outside of the defined area at risk of flooding and is neither located within Flood Zone A or Flood Zone B.

Southill

Most of the regeneration area within Southill is located outside the defined area of flood risk with the exception of an area of land located on the northern side of a tributary of the Ballinacurra Creek. The area of flood risk is located on the western side of the

4. Environmental Baseline

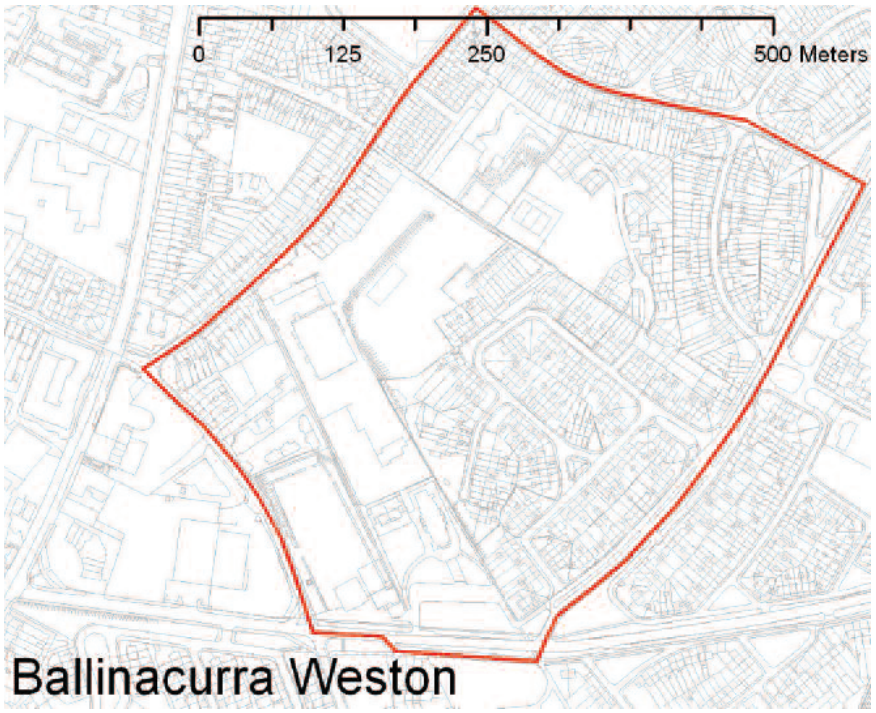

Figure 4.8 Extent of Flooding in Ballinacurra Weston as per information contained in the Limerick City Development Plan

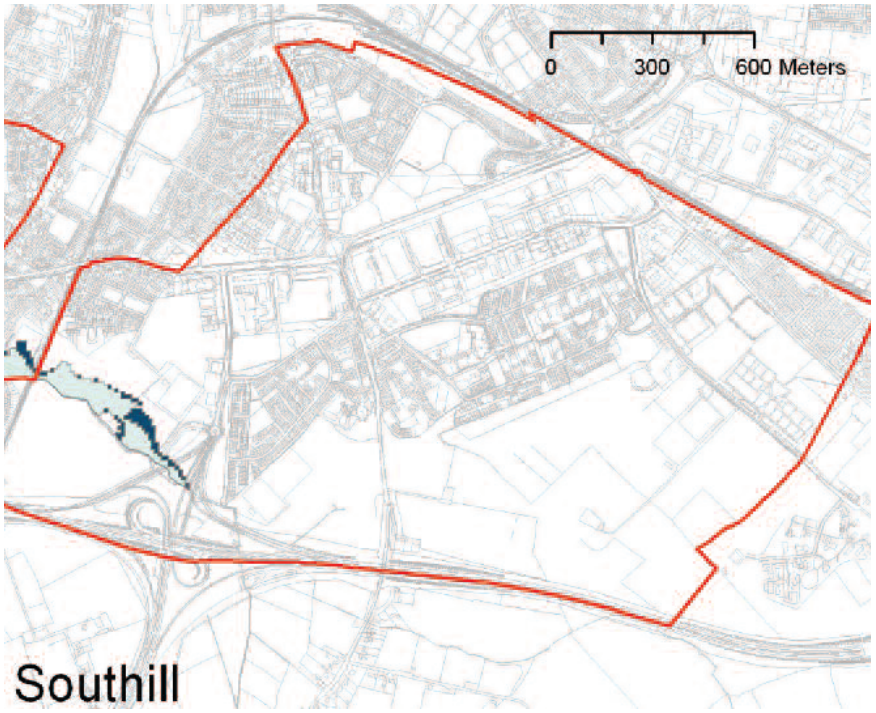

Figure 4.9 Extent of Flooding in Southill

Rosbrien interchange away from the proposed development works within the LRFIP which are located to the north east of the interchange.

4.3.6 Existing Environmental Issues relating to Water

The following broad range of environmental issues relating to water has been identified, which include localised as well as more strategic issues:

- Assist and contribute to the improvement of water quality on the River Shannon to comply with targets set out in the Shannon River Basin Management Plan and associated programme of measure;
- Implement new stormwater management systems following the principles of Sustainable Urban Drainage Systems (SUDS) within development projects;
- Facilitate the conservation of water; `
- Upgrade the existing 3 inch cast iron water main network in St. Mary's Park in tandem with refurbishment works to existing houses; and
- Ensure compliance with the provisions of the Guidelines for Planning Authorities: the Planning System and Flood Risk Management

4.3.7 Non-Implementation of the LRFIP

Significant protection of groundwater and surface water resources is provided for at National, Regional and County level. In the absence of the LRFIP existing legislation and relevant statutory plans including the Shannon River Basin Management Plans and the Limerick City Development Plan 2010-2016 will provide for significant protection and enhancement of water quality. However, the LRFIP in refurbishing existing old houses and associated infrastructure will ensure upgraded services where necessary to ensure the provision of efficient and effective water services to these sites. In terms of flooding the LRFIP seeks to improve the existing situation through a reduction in the number of people that were living in St. Mary's Park within Flood Zone A. This has been facilitated through a process of relocation where appropriate. Furthermore, a number of existing houses within St, Mary's Park have been demolished and where gap sites exist a number of replacement houses are proposed and will be constructed well above existing floor levels in order to mitigate against potential flood

impacts. . A detailed Justification Test has been prepared in support of the proposed demolition and replacement housing programme in St. Mary's Park and is detailed in Appendix 2..

4.4 POPULATION & HUMAN HEALTH

Limerick City, the fourth largest city in the State, has a population of 57,106 [9] persons. The defined regeneration areas occupy almost 3 per cent of the land area of Limerick City and yet accommodate 11 per cent of the total population of the city. Limerick City is the second most disadvantaged local authority area in the country and has been in this position consistently since 1991. Collectively the four regeneration areas include approximately 3,557 houses with a population of over 16,283 people. Across the areas there are a number of common traits in terms of structural economic deficiencies, extensive social problems, and physical planning.

4.4.1 Dependency

The Regeneration Areas have a higher than average youth dependency rate (St. Mary's 39%; Southill 35%; Moyross 39%) with the exception of Ballinacurra which has a rate of 29 per cent. However the Elderly Dependency rate is somewhat different and is particularly varied across the Regeneration Areas. Whilst the elderly dependency rate in Southill and Ballinacurra (18%) is slightly below that for the city (19%) it is only slightly above the national figure of 17 per cent. In contrast St. Mary's has a high elderly dependency rate of 21 per cent and when examined in conjunction with the youth dependency ratio, the overall dependency ratio in that Regeneration Area is highest overall at 60 per cent.

The single parent family tends to dominate the household type with the exception of Ballinacurra where one person households (29%) is higher than the lone parent family at 23%. In the other three areas the percentage of the single parent family stands at almost 27 per cent in St. Mary's Park, 25 per cent in Southill and almost 31% in Moyross. These figures are significant and are well above the State figure of 13 per cent and the 14 per cent of population in Limerick City.

4.4.2 Employment

The number of people at work (over 15 years of age) in the Regeneration Areas is significantly lower than the number of those at work in the city (39%) and the State (58%). St. Mary's has the lowest number of people in employment at 24 per cent and Ballinacurra has the highest which is closest to the city figure at 32 per cent. The rate of unemployment in the Regeneration Areas is significant and well over double the city and State figures of 15 per cent and 12 per cent. Within the Regeneration Areas most would describe themselves as skilled/semi skilled with 35 per cent of the population in Ballunacurra falling within this category followed by Southill (23%); Moyross (20%) and St. Mary's (18%).

4.4.3 Education

Limerick city with only 22 per cent of the population over the age of 15 with a Higher Certificate, Degree or Post Degree qualification has a relatively low-skilled economy. The figures within the Regeneration Areas are even worse with Ballinacurra the most educated with a very low 6 per cent of its population with a Higher Certificate, Degree or Post Degree qualification. The other areas of St. Mary's Park (1%), Southill (3%) and Moyross (2%) are even less educated.

4.4.4 Health

In 1999, the WHO described environmental health as comprising "those aspects of human health, including quality of life, that are determined by chemical, physical, biological, social and psycho social factors in the environment. It also refers to the theory and practice of assessing, correcting and preventing those factors in the environment that can potentially affect adversely the health of present and future generations".

The Regeneration Ares in Limerick exhibits an abnormally high level of disability amongst its population particularly when compared to the national figure of 13 per cent and even the Metropolitan Area figure of 15 per cent and the citywide figure of 18 per cent. Southill has the highest disability figure at just over 23 per cent of its population followed by Moyross and Ballinacurra at 21 per cent and St. Mary's at 20 per cent. Whilst generally the level of disability within a given population is proportional to an ageing population the extent of disability in the Regeneration Areas cannot be solely justified on this basis.

The European Environment and Health Action Plan 2004 – 2010 highlights the major role of health in long-term economic growth and sustainable development and the fact that citizens are concerned about the potential impact of the environment on their health and expect policy makers to act. This includes maintaining air quality at acceptable levels, providing for good quality drinking water and protecting biodiversity and natural heritage. It also includes providing housing that's fit for purpose, providing and maintaining good quality urban form and ensuring a high quality of life for all residents. These are key challenges within the regeneration areas and ones that must be addressed by the LRFIP.

Since January 2008 Limerick Health Promotion and Population Health Services (HSE West) have been conducting a Health Impact Assessment (HIA) on the Regeneration of Limerick City. Due to the size of this project the HIA has been broken up in to sections. A HIA is being conducted on the Health Impacts of the Physical Regeneration of Moyross, Southill and Ballincurra Weston. A full HIA report will not be available until completion of the HIA in its entirety.

The foregoing analysis has highlighted a number of common traits in terms of structural economic deficiencies, extensive social problems, and physical planning across the Regeneration Areas, which are exacerbating what is an already challenging economic situation.

4.4.5 Existing Environmental Issues relating to Population and Health

The provision of new housing and refurbishment of existing stock must be compliant with the objectives of the Core Strategy and the landuse zoning objectives contained in the adopted Limerick City Development Plan. It is also important to assess the potential for impact of the housing renewal/redevelopment on the existing local population base, tenure diversification and social and community structures. In addition the following broad range of issues has been identified:

9 CSO Statistics 2011

4. Environmental Baseline

- Nurturing a mixed-use neighbourhood at sustainable densities that encourages the efficient use of urban land in the plan area;
- Promoting social mix and tenure diversification;
- Addressing wider social and economic issues and not just concentrating on physical improvements and enhancements; and
- Enhancing existing environmental conditions to provide a better quality of life.

4.4.6 Non-Implementation of the LRFIP

In the absence of the LRFIP the quality of life and well being of the existing population within the regeneration communities will not be enhanced and the existing physical, social, community, safety and economic difficulties will continue. Social and economic inclusion of regeneration areas into the mainstream life of the city will not occur and the four regeneration areas will remain isolated within the overall city structure.

4.5 CULTURAL HERITAGE

The architectural and archaeological heritage represents a finite resource and irreplaceable asset to the county and contributes to the quality of the built environment. It is important that structures of architectural and archaeological merit are thus protected.

Archaeological heritage is protected under the National Monuments Acts (1930–2004), Natural Cultural Institutions Act 1997, and the Planning Acts. A primary source of information for known archaeological features is the Record of Monuments and Places (RMP) which was established under the National Monuments Acts 1930 to 2004. The Record of Monuments and Places (RMP) is an inventory, put on a statutory basis by amendment to the National Monuments Act 1994, of sites and areas of archaeological significance.

The protection of architectural heritage comes from Part IV of the Planning and Development Act 2000 - 2011 which deal with Protected Structures and Architectural Conservations Areas (ACAs). The Department of Environment, Heritage and Local Government has prepared the National Inventory of Architectural Heritage for Limerick, which are representative of the diversity of the architectural heritage in the city. The list includes structures with varying categories of interest such as architectural, historic, archaeological, artistic, cultural, scientific, technical or social. The Limerick City Development Plan 2010 -2013 contains an extensive list of protected structures (RPS) within the city along with a number of Architectural Conservation Areas (ACA'S).

4.5.1 St. Mary's Park

Partially located within a Zone of Archaeological Potential this is the oldest part of the city and today is commonly referred to as its 'medieval core'. A number of significant buildings survive from 12th and 13th century Limerick (as well as some remaining extant stretches of the City Wall, which was dismantled in the 1760s. However, much of King's Island's medieval character has been eroded in the past century. Although traces of the medieval streetscape remain, the majority of the area's medieval buildings have disappeared.

The Records of Monuments and Places Map for Limerick (LI005-017) shows that there is a significant amount of archaeology located within the Zone of Archaeological Potential. In addition to the Medieval Core Monuments there are numerous sites located outside the Zone of Archaeological Potential in the outer suburbs of the City.

There are no protected structures located within the defined regeneration area of St. Mary's Park. However there are currently twenty eight structures on the RPS in the wider Kings Island area. In addition, ten structures are currently on the National Inventory of Architectural Heritage (NIAH) of Limerick City, but are included under the existing RPS.

4.5.2 Moyross

A recent Archaeological Assessment for Moyross undertaken for the purposes of facilitating regeneration works shows a small number of known archaeological sites distributed across the regeneration area. The study identified three Recorded Monuments and one delisted site within the regeneration area, consisting mainly of mid to late medieval habitation or castle sites. The locations of the records identified in Figure 4.9 may represent an

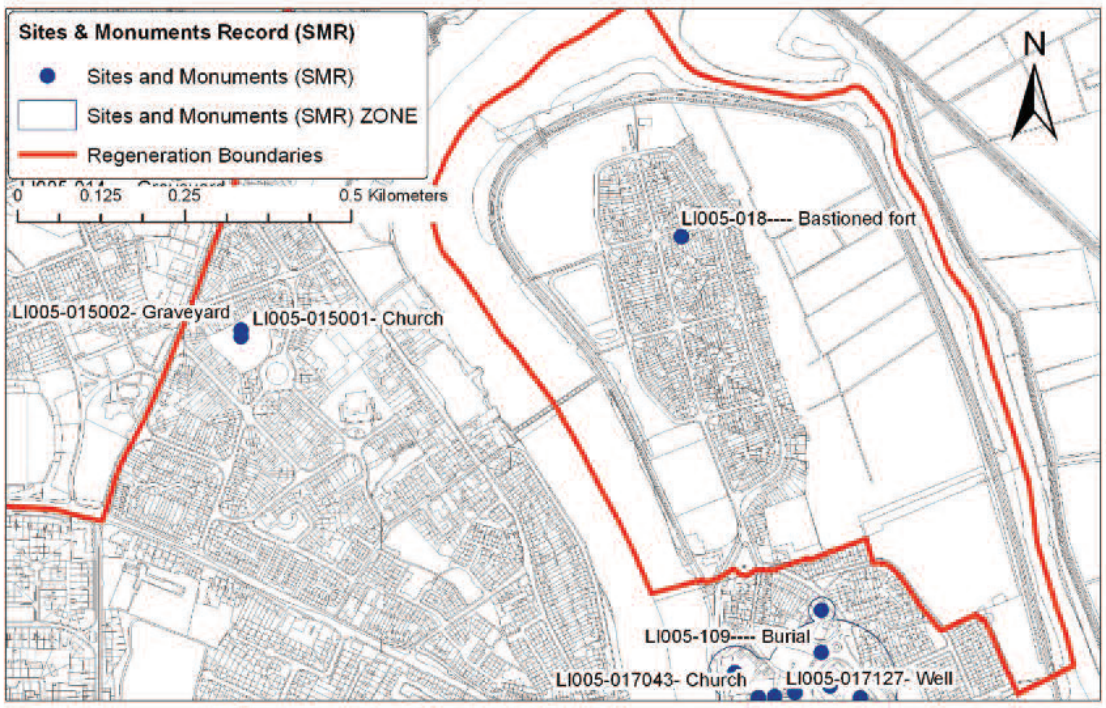

Figure 4.8 Record of Monuments and Places for St. Mary's Park / Kings Island

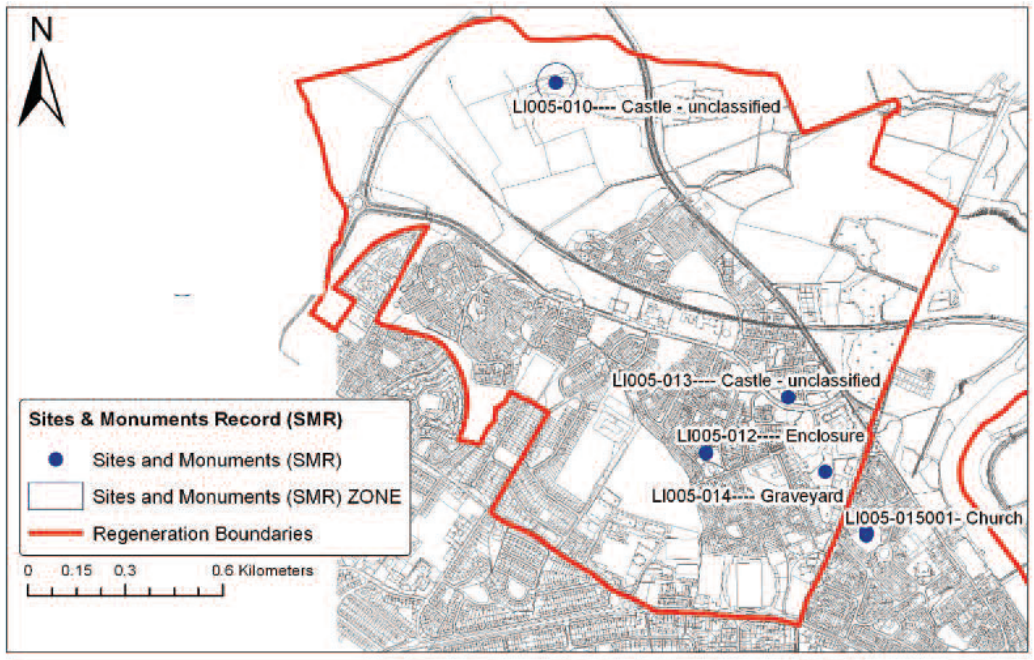

Figure 4.9 Record of Monuments and Places for Moyross

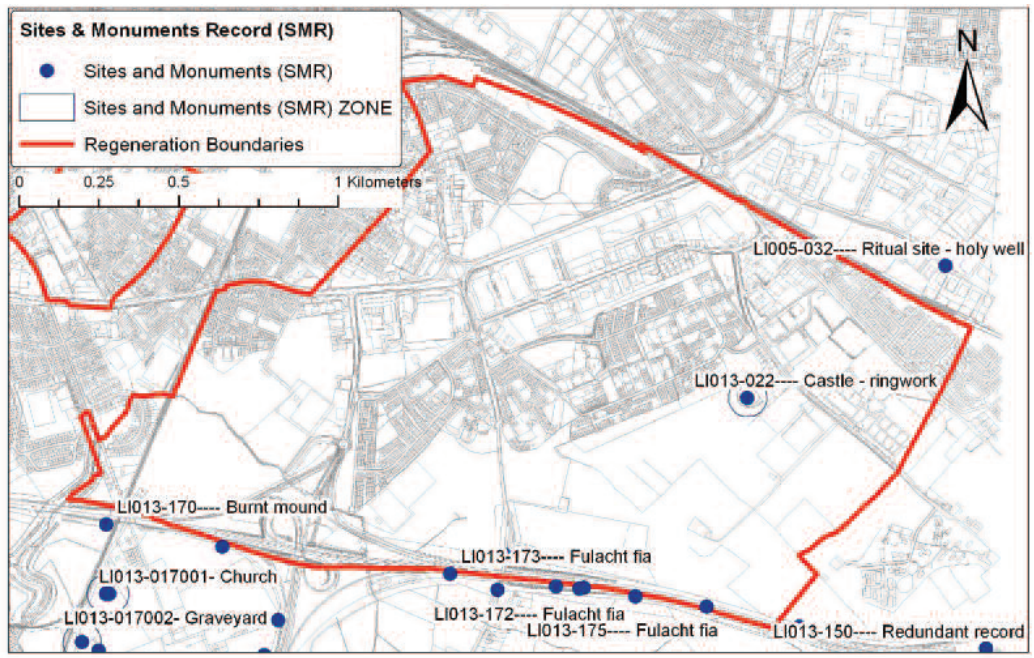

Figure 4.10 Record of Monuments and Places for Southill

estimation and as such there is potential for encountering these features anywhere in the general vicinity.

There are no structures within the regeneration area of Moyross on the Limerick City Record of Protected Structures (RPS). Similarly, none of the structures within the study area feature on the National Inventory of Architectural Heritage (NIAH) compiled for Limerick City.

4.5.3 Ballinacurra Weston

The National Monuments map indicates that there are no statutory protected archaeological sites, monuments or places within the regeneration area of Ballinacurra Weston. The area also falls outside of the Zone of Archaeological Potential identified for Limerick City in the LCDP 2010-2016.

There are no structures within the regeneration area of Ballinacurra Weston on the Limerick City Record of Protected Structures (RPS). Similarly, none of the structures within the study area feature on the National Inventory of Architectural Heritage (NIAH) compiled for Limerick City. However, two of the four designated Architectural Conservation Areas (ACAs) under the Development Plan 2010-2016 occur in proximity to Ballinacurra Weston. The ACAs at Ballinacurra Road and O'Connell Avenue are intended to safeguard the architectural character of these residential areas.

4.5.4 Southill

There are a number of local sites of archaeological heritage within Southill most of which are located along the southern boundary of the M7 route and have been assessed as part of the M7 Environmental Impact Statement for the Southern Ring Road. One other site of archaeological interest is located on the northeast of the existing golf course. It should be noted that all monuments recorded have been encroached on to some degree by the M7.

Southill House is listed on the NIAH survey. There are no structures within the regeneration area of Southill on the Limerick City Record of Protected Structures (RPS).

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4.5.5 Existing Environmental Issues relating to Cultural Heritage

Protection of the existing built environment and archaeological heritage is intrinsic to the LRFIP area. The following broad range of issues has been identified for cultural heritage:

- Preserving and enhancing the setting and character of the built heritage of the area and to ensure future development has regard to the historical value of these sites;
- Promoting the in-situ preservation of archaeology within the LRFIP area where possible; and
- Encouraging the practical use and re-use of existing vacant or derelict protected structures.

4.5.6 Non Implementation of the LRFIP

The LRFIP presents an opportunity to preserve the cultural heritage of the area and highlight the past historic and cultural landscape. Furthermore, the more intangible aspects of cultural heritage including identity and sense of place may not be promoted and supported as strongly in the absence of the LRFIP.

4.6 SOILS AND GEOLOGY

4.6.1 Soils

The need for concerted soil protection in Europe was highlighted in 2006 when the European Commission adopted the Thematic Strategy for Soil Protection (Commission of the EC, 2006a). The strategy included a proposal for a Soil Framework Directive which aims to ensure the sustainable use of soil through measures including pollution prevention and the implementation of national inventories, monitoring programmes and remediation strategies for contaminated sites in EU Member States. The proposal is currently under consideration by European institutions.

The function of soils in abating climate change is particularly important in a regional context for cities such as Limerick experiencing rapid growth beyond city boundaries. The conversion of greenfield sites and sealing of soils can release CO_2 into the atmosphere and further reduce areas of 'carbon sinks'. Soils contain about three times the amount of carbon globally as vegetation, and about twice that in the atmosphere. Article 5 of the proposal of the Soil Framework Directive states that, for the purposes of preserving the various functions of soil, sealing, and the development of artificial surfaces on top of soil resources, should be limited. The proposed Directive also states that soil should be used in a sustainable manner which preserves its capacity to deliver ecological, economic and social services, while maintaining its functions so that future generations can meet their needs.

The GSI (Geological Survey of Ireland) Teagasc Subsoil database provides information on the soil type found throughout Limerick City detailed in Figure 4.11.

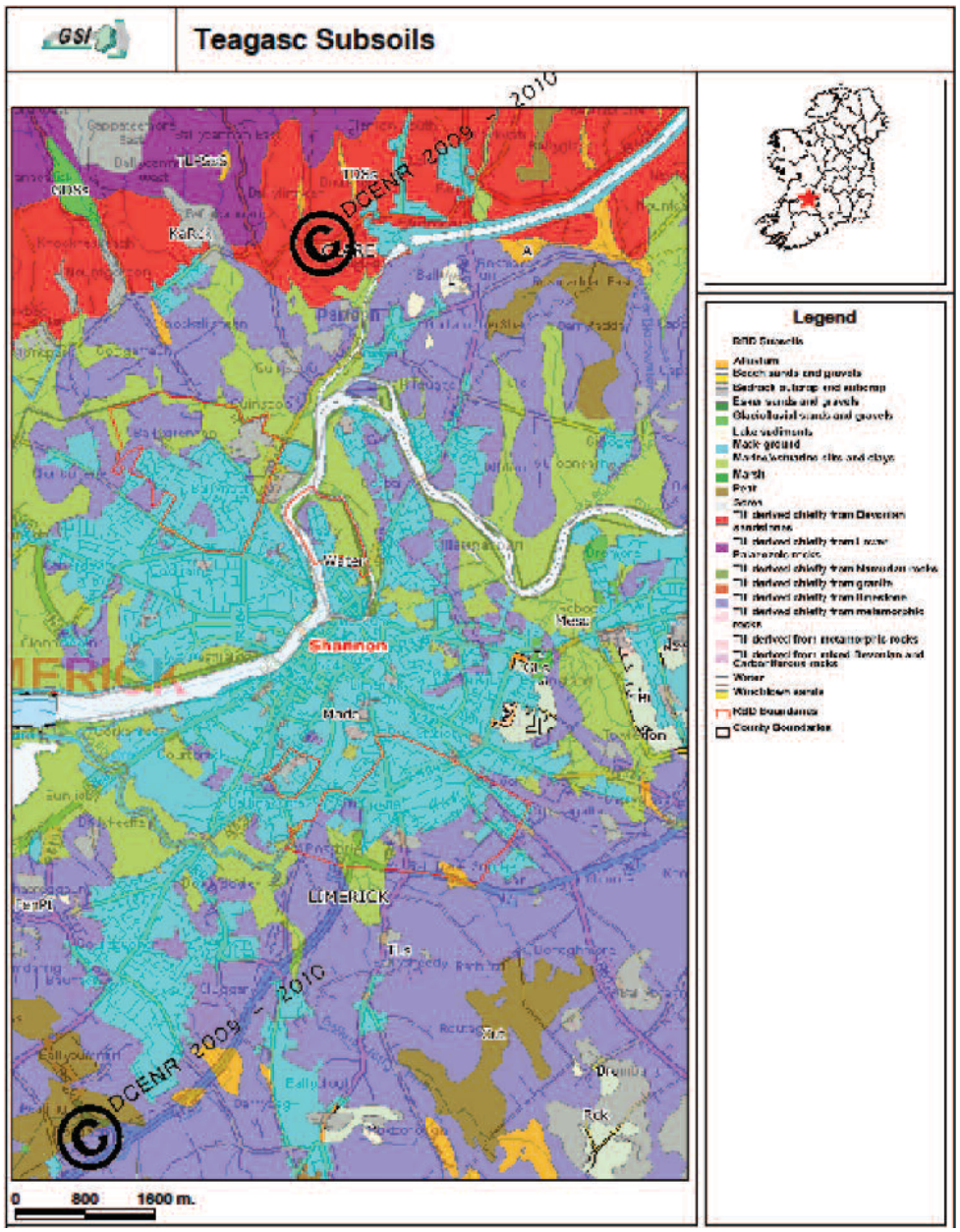

Figure 4.10 Soil classification within the Regeneration Areas

St. Mary's Park
The GSI Teagasc SubSoil database demonstrates that the soil type found within the study area consists of 'made ground' and "Till derived chiefly from limestone". Made ground is natural soil altered, partly with fill materials and is associated with prior construction.

Moyross
The SubSoil database demonstrates that soil types found within Moyross range from Marine/Estuarine Silts and Clays, Till derived from Limestone, Made Ground and Bedrock. Active bedrock as shown to the northeast of the site might result in subsidence or instability of the ground surface. The Made Ground is associated with prior road construction and other development construction. There are two closed landfill sites within the Moyross area. The Long Pavement site covers an area of approximately 2.4 hectares. The site is immediately adjacent to the River Shannon just outside the boundary of the Regeneration area. A strategy for the Long Pavement Landfill Restoration was prepared in 2000 and remedial works have recently been completed.

Ballinacurra Weston
Soil types found within the study area include a mix of Made Ground and Bedrock. Active bedrock is evident to the north-east of the regeneration area which might result in subsidence or instability of the ground surface. Made ground is present within the study area and is associated with prior road construction and other developments.

Southill
Soil types found within the study area range from Marine/Estarine Silts and Clays, Till derived from Limestone, Made Ground and Bedrock. An old limestone quarry is located within Southill, south of Keyes Park and east of Roxboro Road and was previously used as a landfill for domestic waste. It was closed in 1987. A preliminary investigation was carried out for leachate and gas emissions and the landfill has been registered on the Environmental Protection Agency (EPA) database in compliance with legislation.

4.6.2 Geology

The need to develop a more coherent approach to the protection of soils has been recognised at European level and there has been a shift in focus from policies relating mainly to the agricultural sector to policies based on environmental protection. The Geological Survey of Ireland (GSI) in tandem with the National Parks and Wildlife Service of the DoAHG, established the Irish Geological Heritage Programme in 1998. The programme aims to identify and select sites of geological heritage within Ireland for future designations as NHAs. To date no geological site has been statutorily designated through the DoAHG as an NHA.

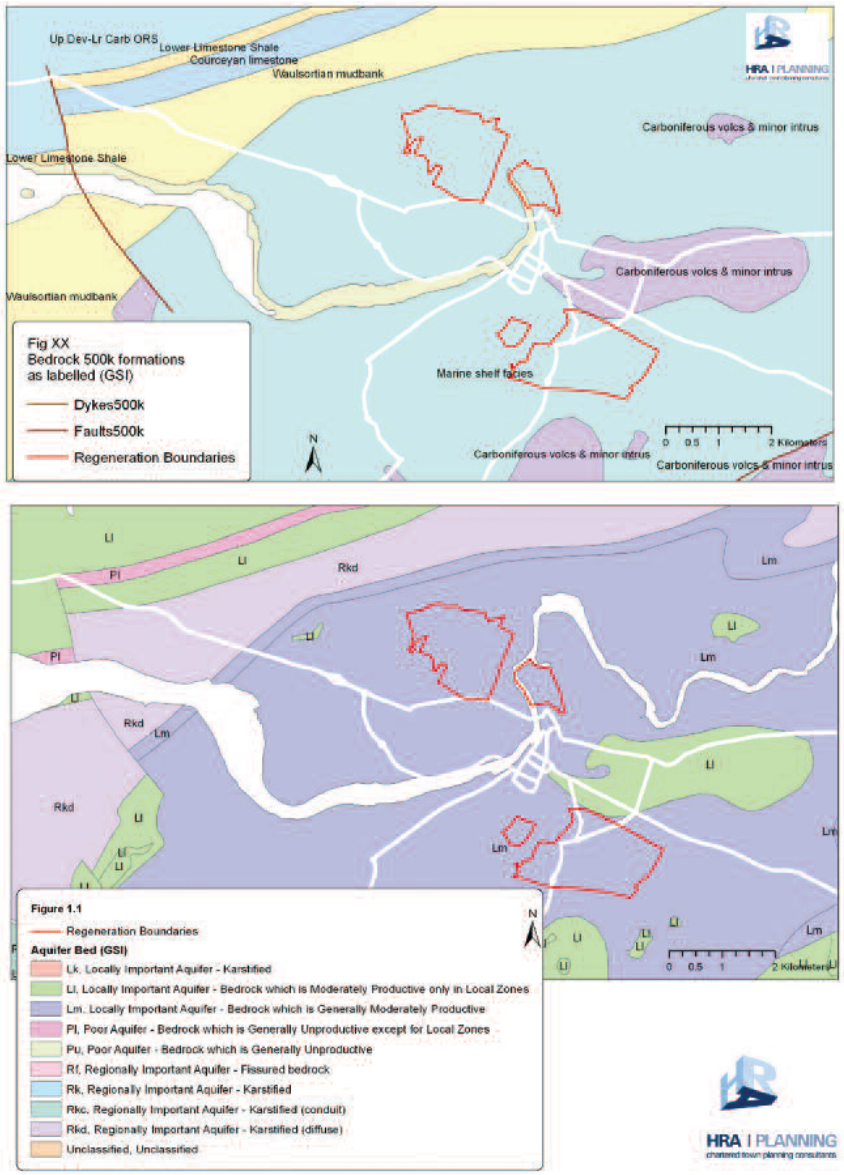

Figure 4.11 Bedrock and Groundwater Vulnerabilit

4. Environmental Baseline

An understanding of geological issues also provides important information on bedrock formations and groundwater vulnerability as detailed in Figure 4.11. The four regeneration areas are located within a locally important aquifer region with bedrock which is generally moderately productive.

4.6.3 Existing Environmental Issues relating to Soils & Geology

The works proposed under the LRFIP shall occur in an existing urbanised environment with significant development occurring on brownfield sites. Nonetheless limited greenfield development will occur in the longer term to facilitate possible private development thereby contributing to social mix. The following broad range of issues has been identified for soils and geology including:

- Compaction and sterilisation of topsoil could alter the infiltration and drainage characteristics of the soils;
- Recreational uses whilst preferable can result in pressures on soils and their habitats, including erosion;
- Lack of protection and mitigation of impacts of construction on soils, causing soil structural degradation and compaction; and
- Modification of soil structure following extensive demolition works.

4.6.4 Non Implementation of the LRFIP

The LRFIP will be the guiding document for development within the regeneration areas for the coming years. In its absence the Limerick City Development Plan in its current form will continue to guide development but to a lesser extent than that identified in the LRFIP. Without the LRFIP, demolition works, refurbishment works and development are likely to be sporadic and uncontrolled leading to a significant deterioration in the soil and geology environment. Also the process for assessing the issues which affect the soil and geological environment within the regeneration areas will go unchecked, resulting in a general deterioration

4.7 AIR AND CLIMATIC FACTORS

4.7.1 Air

The Air Quality Framework Directive 96/62/EC has been transposed into Irish Law by the Air Quality Standards Regulations 2002 and the Ozone Regulations 2004. The Air Quality Standards Regulations have recently been replaced by the Clean Air for Europe (CAFÉ) Directive 2008 (2008/50/EC) which sets out the requirements for monitoring pollutants and the target values for each pollutant.

Air quality monitoring in Ireland is undertaken largely to implement EC Directives on smoke and sulphur dioxide (SO_2), lead, ozone and nitrogen dioxide (NO_2) to assess compliance with national air quality standards. Limerick City Council have three air monitoring stations at Moyross, Southill and the city centre where smoke and sulphur dioxide are continuously monitored. Air quality in Limerick has never yet exceeded EU limits for these parameters.

The Air Quality Framework Directive requires that member states divide their territory into zones for the assessment and management of air quality. There are four zones identified in Ireland. Zone C includes Limerick and the air quality for zone C is classified as good. Monitoring has been completed on the Park Road just outside the city and monitoring is currently ongoing on the Shannon Estuary.

4.7.2 Climate Change

Climate change is a transboundary issue affecting the entire globe and is fundamental to social stability and sustainable development. It is widely recognised that the build up of atmospheric Greenhouse Gases (GHGs) such as carbon dioxide is threatening global climate stability. Ireland ratified the UN Framework Convention on Climate change in 1994 and the Kyoto Protocol in 1997. Ireland gave an undertaking to limit the net growth of GHG to 13% above 1990 levels by the period 2008-2012 and successfully met this target. For the period beyond 2012 the EU Councils of Ministers has agreed to an ambitious target of 20% reduction on 2005 GHG emissions levels, possibly increasing to 30% depending on other developed countries agreements.

Nationally the National Climate Change Strategy incorporates Ireland's international commitments into a range of actions that take into account commitments from government papers such as the White Paper on Delivering a Sustainable Energy Future and the National Bio-Energy Action Plan. There are numerous other directives that will have positive effects on climate change such as the National Energy Efficiency Action Plan.

At a local level the aim of the Climate Change Strategy for the Mid West Region is to clearly identify the solutions to the challenge of reducing energy related emissions and to outline the actions to be taken to meet the requirements under the Kyoto Protocol. The strategy identifies renewable energy, transport, built environment and industrial/commercial development as key sectors where action needs to be taken. Unsurprisingly within Limerick City (2004) the transport sector had the highest consumption in energy terms at 36% and accounted for 28% of CO_2 emissions. However the residential sector was found to be the highest contributor in terms of emissions, at 30% of CO_2 emissions. The strategy promotes residential energy performance over and above national targets to address the high emissions in the residential sector.

4.7.3 Existing Environmental Issues relating to Air and Climatic Factors

Land use changes can and will have far-reaching implications for climate change particularly related to commuter patterns and the resultant increase in GHGs, SO_2, NOx, VOCs and other pollutant emissions. The following broad range of issues has been identified for air and climatic factors including:

- Innovative measures to ensure a continuous reduction in CO_2 emissions;
- Achieving high residential energy performance targets in refurbishment and new build projects;
- Emissions of air pollutants, particularly from road traffic, remain the main threat to air quality; a modal shift from the private car to high quality public transport is required; and
- Encouraging walking and cycling through the provision of cycle ways and increased permeability within the regeneration areas.

4.7.4 Non Implementation of the LRFIP

Air quality and climatic factors are transboundary issues and largely outside the control of any one functional area or local authority. However, it requires a collective approach in order to counter potential impacts. In the absence of the LRFIP issues may potentially arise through unsustainable transport patterns through a lack of coordinated transport policy. Poor connectivity and permeability would continue within the regeneration areas which could potentially mitigate against increased levels of walking and cycling. This would lead to increased emissions and ultimately to an exacerbation of the climate change problem.

4.8 NOISE

There is no national standard for recommended noise thresholds in Ireland. The Limerick City Development Plan states that the noise level arising from any commercial development should not exceed 55dB LAeq during the daytime, and 45dB LAeq during the night, when measured at the site boundary

The Environmental Noise Directive (2002/49/EC) aims to put in place a European wide system for identifying sources of Environmental noise, informing the public about relevant noise data and taking the necessary steps to avoid, prevent or reduce noise exposure. Arising from this Directive the Environmental Noise Regulations, relating to the assessment and management of environmental noise came into effect in 2006.

On foot of this legislation the Limerick City and County Councils have prepared a Draft Noise Action Plan aimed at strategic long term management of environmental noise from transport systems in both Limerick City and County. Under the regulations, Strategic Noise Maps and Noise Action Plans were required to be prepared in respect of noise from three different sources including rail lines, major airports and major roads. As no airports or rail routes were above the threshold and as the agglomeration of Limerick is below the threshold only noise from major roads were considered in the plan. The NRA as the Noise Mapping Body for national roads, prepared Strategic Noise Maps for all relevant motorways and national routes. Based on these maps, population exposure to various noise bands has been estimated and a number of noise "hot spots" identified. There is one hotspot prioritized for noise management within the regeneration area namely the junction of the R445 and R463 on King's Island.

4.8.1 Existing Environmental Issues relating to Noise

The following broad range of environmental issues relating to Air Quality and Noise has been identified which include localised as well as more strategic issues:

- Ensuring that new residential development is designed and constructed in such a way as to minimise noise disturbances, particularly from traffic, and the need to manage potential noise form other commercial units; and
- Recognition of the need to maintain the overall low level of noise where it exists while also reducing the high level of noise at 'noise hot spots' where relevant particularly at the junction on King's Island.

4.8.2 Non Implementation of the LRFIP

The LRFIP has the potential to influence or undertake mitigation measures in planning for development near or proximate to the R445 and R463 on King's Island. Without the LRFIP such measures would not be practically implemented.

4.9 LANDSCAPE AND AMENITY

The concept of landscape encompasses all that can be seen by looking across an area of land. It is the visible environment in its entirety. Landscape is the context in which all change takes place and helps to create a unique sense of place or identity within an area. The landscape is constantly changing, both through the actions of nature and human intervention, therefore the challenge is to bring about change and development that respects and enhances the landscape as opposed to detracting from it.

There is currently no published landscape mapping for Limerick city or for the country. There are no regional or local designations affecting the urban sites. However, the green areas, the natural heritage and recreational amenities within the LRFIP have the potential to play a key role in creating and sustaining place. Aerial views of the regeneration areas depict a landscape in transition between completed and occupied development, demolished and vacant sites and semi completed works. Quality recreation and leisure facilities have a fundamental impact on the quality of life in a city and to its social integration and cohesiveness. Amenities within the regeneration areas include natural and recreational amenities as well as social and community infrastructure.

4.9.1 St. Mary's Park

St. Mary's Park is characterised by an island of housing surrounded by a large expanse of natural open green space bound on all sides by water. The River Shannon and its rich riparian and wetland habitats as a key strength of the St. Mary's Park area.

Within King's Island, there are ample amounts of passive open space areas which are accessible to the public. However, the bulk of this space offers little in terms of passive recreation facilities, aside from the earthen embankment topped with a footpath which surrounds three sides of the island. Elsewhere, this space is largely characterised by wide expanses of open fields which are low lying and liable to flooding. Consequently, in terms of passive recreational activities, the majority of this space remains underutilised.

4.9.2 Moyross

Moyross forms part of a suburban residential setting but also comprises a vast expanse of undeveloped Greenfield land. Whilst the River Shannon flows in proximity to Moyross it does not fall within the regeneration area. An area of scrub-woodland dominates the north central part of Moyross, elevated above the surrounding ground by several metres. Situated mostly within Co. Clare the Knockalisheen Marsh extends to the north of Limerick City along the Knockalisheen Road and extends into the regeneration area as a wetland area.

To the south of the Knockalisheen Road the entrance to Castle Park Estate has a swathe of mixed broad-leaved woodland that extends up to and around the derelict house, while two linear belts run along the Knockalisheen road north and south. There are large extents of passive open space within Moyross much of

4. Environmental Baseline

which is underutilised and also open space that is not readily distinguishable as either public or private.

4.9.3 Ballinacurra Weston

Ballinacurra Weston comprises a suburban residential setting with limited open space provision. The largest expanses of open space in the area at present include the piece of land to the rear of the community centre and the area of ground to the south of the Adapt House complex. The recent provision of a number of active open space areas to the rear of the community centre, including a seven a side pitch, with two areas of passive open space – consisting of a garden for older people and a garden for the crèche have enhanced significantly the area's amenity provision. The other area of significant open space at Clarina Park, presents problems in terms of anti-social behaviour due to the lack of surveillance and security in the area.

The most significant tree groups occur at different intervals to the north of the area, particularly to the rear of Adapt House and to the rear of Beechgrove Estate. Given the lack of existing natural landscape within Ballinacurra Weston it would be desirable to protect and enhance any existing features.

4.9.4 Southill

Southill primarily comprises a suburban residential setting with defined commercial and community areas particularly along Roxboro Road. The Rathbane Municipal Golf Course provides an extensive area of open space. Southill House Demesne located along the Roxboro Road contains significant mature tree groups consisting of Holm's Oak, Elm trees, Sycamore, Yew and some hawthorn and holly with evidence of a rookery creating a scenic landscape. Smaller clusters or bands of trees are noted at other locations within Southill, at the primary school by O'Malley Park, the boundary of the Golf Course, St. Enda's School, and at the eastern end of the Galvone Industrial Estate. Given the lack of existing natural landscape within Southill it would be desirable to protect and enhance any existing features.

4.9.5 Existing Environmental Issues relating to Landscape

The LRFIP proposes to develop some existing areas of open space in an attempt to enhance the overall quality of the built and natural environment. Whilst such developments may be acceptable in certain instances the following broad range of issues has been identified for landscape

- Ensuring the natural environment and open space amenities are connected and integrated as main features of the area's identity and character;
- Diversification of the existing landscape character through the creation of new open spaces including urban squares, walkways and cycle routes;
- Maintaining open space provision whilst ensuring legibility, connectivity and permeability within the regeneration areas; and
- Providing practical, useable and attractive open space with natural surveillance.

4.9.6 Non Implementation of the LRFIP

In the absence of the LRFIP there would be no framework seeking to enhance the quality of the landscape within the regeneration areas and no framework to improve existing open space provision.

4.10 MATERIAL ASSETS

For the purposes of this section of the report the Material Assets section includes Transportation and Waste Management.

4.10.1 Transportation

A significant challenge facing the LRFIP is the existing road network and the lack of connections into and within the regeneration areas. The existing road network and lack of connections isolates the regeneration areas from the rest of Limerick city and exacerbates existing social problems. With car ownership relatively low in the regeneration areas there is still a desire to encourage other modes of transport. It is therefore a challenge for the LRFIP to meet the growing demand for travel by sustainable forms of transport other than private car including public transport, walking and cycling. There are no delineated cycle lanes currently within the regeneration areas with weak pedestrian connections and linkages.

St. Mary's Park

St. Mary's Park is located in close proximity to the city centre, some 800m from the city core. However, access to St. Mary's Park is limited to one main entrance from Island Road Roundabout and three other older access routes culminating in essentially one access point at St. Ita's Street to a large cul-de sac. This has resulted in isolating the northern half of the Island from the rest of the city and has made walking and cycling difficult as cars dominate the only route in and out of the area.

Moyross

Perhaps the biggest single movement issue for Moyross is the lack of connectivity between it and the surrounding neighbourhoods. Even within Moyross itself it is difficult to navigate given the illegible block layout with each sub estate consisting of large cul-de-sacs. This situation is at the heart of most of the major movement problems of the area. Given this lack of permeability into and across the study area, access to employment and services is poor contributing to its social-economic problems. There are two Bus Eireann routes which provide a frequent public transport system to and from Limerick City Centre. The Limerick to Ennis rail line runs east-west through the area.

Ballinacurra Weston

Ballinacurra Weston is located within the context of a number of major transport axes which carry large volumes of traffic on a daily basis. Located in a built-up urban environment Ballinacurra Weston has good connections into the centre of Limerick City. O'Connell Avenue (N20), which joins up with the city's main thoroughfare O'Connell Street, is located to the north-west of the study area, and the Hyde Avenue/Road, which skirts the south-eastern regeneration boundary, leads to Limerick Train Station. Located to the south of the regeneration area are attractors such as the Mid-Western Regional Hospital and the Crescent Shopping Centre. Ballinacurra Weston itself is directly bordered by transport routes on all sides. The area is well served by bus operators however no bus routes currently pass through the regeneration area.

Southill
Restricted access to Southill currently exacerbates the existing socio economic problems in the area. There is a single access point from John Carew Road into Carew Park and Kincora Park estates. However this is only accessible to traffic travelling out of the city and can not be accessed from the national road network the M7. This restriction is significantly stifling economic development in the area and hindering commercial development.

Dominated by Childers Road which runs in an east/west direction through Southill, the road is dominated by commercial and retail development including Roxborough Shopping Centre and the LEDP offices along with further residential dwellings at Janesboro. Beyond the Roxboro Roundabout Galvone Industrial Estate turns its back on Childres Road providing an unattractive edge to an important arterial route.

4.10.2 Waste Management

National waste policy is well established in Ireland with the foundation laid in the publication of Changing Our Ways in 1998. At the core of this national policy statement is the EU Waste Hierarchy with a preference for the prevention, reuse and recycling (including biological treatment) of waste ahead of energy recovery and landfill disposal. The waste sector is estimated to account for an estimated 2% of total green house gas emissions in 2009.

Limerick City Council works with the county councils of Clare, Kerry and Limerick to manage waste in the region. The Replacement Waste Management Plan for the Limerick/Clare/Kerry Region 2006-2011 sets out the current regional policy framework to progress the sustainable management of waste arising in the region to 2011. The strategy in the Waste Plan aims to promote waste prevention and awareness, deliver maximum recyclings and by doing so minimize the use of landfill disposal. Targets of 45% recycling, 41% thermal treatment and 14% disposal were set. An Evaluation of the Replacement Waste Management Plan for the Limerick/Clare/Kerry Region 2006-2011 was undertaken and concluded that a new Waste Management Plan be prepared. The evaluation confirmed that household recycling was at 13.9% in 2004 and now has reached 42%. Commercial recycling has increased to over 60%.

Construction and Demolition Waste
The National Construction and Demolition Waste Council have been established and tasked with achieving the national recycling targets. It launched a voluntary initiative in October 2004 which included best practice guidelines prepared by the Department of Environment, Heritage and Local Government for the preparation of Construction and Demolition Waste Management Plans for developments above certain stated thresholds. The construction and demolition waste was the biggest waste stream in the region in 2006 but the effect of the economic downturn has reduced the generation rates of this waste by 81%. This is a significant issue for the regeneration areas given the extent of demolition works proposed.

Bring Facilities and Civic Amenity Facilities
There are twenty two bring banks located in Limerick City and under the Waste Management Plan a further two are required. Presently there are no bring bank facilities within the defined regeneration area of St. Mary's Park. Moyross has three facilities, Southill has one facility and Ballinacurra Weston has none given its proximity to the city centre.

4.10.3 Existing Environmental Issues relating to Material Assets

The regeneration areas are well established but poorly linked to the wider city. The following broad range of issues has been identified for transportation:

- Adaptation of the existing road infrastructure network and provision of additional links to reconnect with the city;
- Emphasis on sustainable forms of transport such as walking, cycling and public transport;
- Integration of transport and land use;
- Provision of cycleways and pedestrian linkages; and
- Enhancement of linkages within the regeneration areas through the creation of new walkways, opening up of new pathways and an overall increase in connectivity.

The following broad range of issues has been identified for waste management:

- Consideration of disposal of demolition waste in the context of its impact on waste management and the need for demolition waste management plans;
- Consideration of the reuse of materials rather than the use of new materials;
- Consideration of the use of renewable materials including low embodied energy materials and low toxic materials;
- Assessment of whole life environmental impacts; and
- Ensuring that guidelines and standards for the storage, segregation and removal of waste at individual development/site level are taken into account at the planning stage.

4.10.4 Non Implementation of the LRFIP

In the absence of the LRFIP there would be no framework at a local level from a transportation perspective and the existing road network would continue to be fragmented and remain incomplete. The absence of the LRFIP would also result in the loss of potential for modal shift to other more sustainable forms of transport. This shift would contribute to a reduction in air and noise pollution and a healthier local environment in general.

5. Environmental Protection Objectives

5.1 INTRODUCTION

Envrionmental Protection Objectives (EPOs) are methodological measures against which the environmental effects of the LRFIP can be tested. If complied with in full, EPOs would result in an environmentally neutral impact from realisation of the LRFIP. The EPOs are set out under a range of topics and are used as standards against which the provisions of the LRFIP can be evaluated in order to help identify areas in which potential significant adverse impacts may occur. EPOs are distinct from the objectives of the LRFIP and are developed from international and national policies which generally govern environmental protection objectives. Such policies include those of various European Directives which have been transposed into Irish law and which are intended to be implemented across the country.

The SEA Directive requires that the evaluation of the LRFIP be focused upon the relevant aspects of the environmental characteristics of areas likely to be significantly affected. In compliance with this requirement the SEA will focus upon the most relevant aspects of the environmental characteristics. The EPOs are linked to indicators which can facilitate monitoring the environmental effects of the LRFIP, as well identifying targets which the LRFIP can help work towards.

The SEA carried out on the Limerick City Development Plan 2010 – 2016 identified a number of Envrionmental Protection Objectives (EPO's) for the city. Whilst it is important that EPOs identified for the city are consistent it is also important that the specifics and detail of the LRFIP, which differs from the City Development Plan, are adequately assessed. Therefore, the EPOs identified for the LRFIP whilst generally consistent with the City Development Plan, have been broadened to include additional objectives.

5.2 BIODIVERSITY, FLORA AND FAUNA

5.2.1 International, European and National Strategic Actions

Habitats Directive 1992

The European Council Directive on the Conservation of natural habitats and of wild fauna and flora (92/43/EEC), referred to as the Habitats Directive, aims to ensure the conservation of certain natural habitats and species at favourable conservation status. Special Areas of Conservation (SACs) are designated and protected under the Habitats Directive 1992 (92/43/EEC) due to their conservation value for habitats and species of importance in the European Union. The Habitats Directive establishes Natura 2000, a network of protected areas throughout the EU. SACs together with Special Protection Areas (SPAs) – which are designated under the 1979 and 2009 Birds Directives – make up the Natura 2000 network of protected sites.

Article 6 of the Habitats Directive provides for the need to undertake Appropriate Assessments of plans or projects which have the potential to impact upon Natura 2000 sites. Article 10 of the Habitats Directive recognises the importance of ecological networks as corridors and stepping stones for wildlife, including for migration, dispersal and genetic exchange of species of flora and fauna. The Directive requires that ecological connectivity and areas of ecological value outside the network of designated ecological sites are maintained, and it recognises the need for the management of these areas through land use planning and development policies. The integration of the requirements of Article 6 of the Habitats Directive into the Planning and Development Acts and the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) puts the requirement for Appropriate Assessment into context for both projects and plans.

Birds Directive 1979

The 1979 European Council Directive on the Conservation of Wild Birds (79/409/EEC), referred to as the Birds Directive, – as well as its amending acts (particularly, Directive 2009/147/EC) – seeks to protect, manage and regulate all bird species naturally living in the wild within the European territory of the Member States, including the eggs of these birds, their nests and their habitats; and to regulate the exploitation of these species. The Directive places great emphasis on the protection of habitats for endangered as well as migratory species, especially through the establishment of a coherent network of Special Protection Areas (SPAs). SPAs are protected under the Directive and have been designated in Ireland by the DAHG due to their conservation value for birds of importance in the European Union.

UN Convention on Biological Diversity 1992

The United Nations Convention on Biological Diversity 1992 requires the promotion of the conservation and sustainable use of biodiversity.

National Biodiversity Plan 2011

The preparation and implementation of Ireland's National Biodiversity Plan 2011 complies with an obligation under the UN Convention on Biological Diversity. The overall goal of the Plan is to secure the conservation, including where possible the enhancement and sustainable use, of biological diversity in Ireland and to contribute to conservation and sustainable use of biodiversity globally. Objectives following on from this goal are to:

- Conserve habitat diversity, including all sites of special biodiversity importance;
- Conserve species diversity;
- Conserve genetic diversity, both wild and domesticated; and,
- Contribute to the conservation and sustainable use of biodiversity and to advancing other obligations of the CBD in the EU, regionally and internationally.

Convention on Wetlands of International Importance 1971

The Convention of Wetlands of International Importance, especially as Water Fowl Habitat, was established at Ramsar in 1971 and ratified by Ireland in 1984. The main aim of the Convention is to secure the designation by each contracting state of wetlands in its territory for inclusion in a list of wetlands of international importance for waterfowl. This entails the commitment of each contracting state to a policy of protection and management of the designated wetlands, and of formulating and implementing planning so as to promote the conservation of designated wetlands and, as far as possible, the wise use of wetlands in its territory.

UNESCO World Heritage Sites

Ireland ratified the World Heritage Convention concerning the Protection of the World Cultural and Natural Heritage in 1991. The Convention is an

international agreement which was adopted by the General Conference of the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 1972. The Convention established the World Heritage List which comprises sites of outstanding universal value – cultural, natural or mixed. By signing the Convention, Ireland has pledged to conserve not only the World Heritage sites situated on its territory, but also to protect its national heritage.

Wildlife Act 1976 and Wildlife (Amendment) Act 2000

The basic designation for wildlife is the Natural Heritage Area (NHA). They cover nationally important semi-natural and natural habitats, landforms or geomorphological features, wildlife plant and animal species or a diversity of these natural attributes. Under the Wildlife Amendment Act (2000), NHAs are legally protected from damage from the date they are formally proposed for designation. Proposed NHAs (pNHAs) were published on a non-statutory basis in 1995, but have not since been statutorily proposed or designated – designation will proceed on a phased basis over the coming years.

'Wildlife Site' as defined by the Planning and Development Act 2010

The Planning and Development Act 2000, as amended, defines a 'wildlife site' as:

a) an area proposed as a natural heritage area and the subject of a notice made under section 16(1) of the Wildlife (Amendment) Act 2000;
b) an area designated as or proposed to be designated as a natural heritage area by a natural heritage area order made under section 18 of the Wildlife (Amendment) Act 2000;
c) a nature reserve established or proposed to be established under an establishment order made under section 15 (amended by section 26 of the Wildlife (Amendment) Act 2000) of the Wildlife Act 1976;
d) a nature reserve recognised or proposed to be recognised under a recognition 5 order made
e) under section 16 (amended by section 27 of the Wildlife (Amendment) Act 2000) of the Wildlife Act 1976, or
f) a refuge for fauna or flora designated 10 or proposed to be designated under a designation
g) order made under section 17 (amended by section 28 of the Wildlife (Amendment) Act 2000) of the Wildlife Act 1976.

This definition has been taken into account during the formulation of EPO B3.

European Communities (Birds and Natural Habitats) Regulations 2011

The European Communities (Birds and Natural Habitats) Regulations 2011 consolidate the European Communities (Natural Habitats) Regulations 1997 to 2005 and the European Communities (Birds and Natural Habitats) (Control of Recreational Activities) Regulations 2010, as well as addressing transposition failures identified in the CJEU judgements.

5.2.2 EPOs Indicators and Targets

EPO		Indicator	Target
B1	To ensure compliance with the Habitats Directive with regard to the protection of Natura 2000 Sites and Annexed habitats and species	Conservation status of habitats and species as reported upon under Article 17 of the Habitats Directive	Maintenance of favourable conservation status for all habitats and species protected under national and international legislation to be unaffected by implementation of the LRFIP
B2	To effectively manage other environmental features and maintain wildlife corridors which are of major importance for wild faunaand flora and essential for the migration and dispersal of wild species	Percentage loss of functional connectivity without remediation resulting from development provided for by the LRFIP	No significant ecological networks or parts thereof which provide functional connectivity to be lost without remediation resulting from development provided for by the LFIP
B3	To avoid significant impacts on relevant habitats, species, environmental features or other sustaining resources in Wildlife Sites.	Number of significant impacts on relevant habitats, species, environmental features or other sustaining resources in Wildlife Sites resulting from development provided for by the LRFIP	Avoid significant impacts on relevant habitats, species, environmental features or other sustaining resources in Wildlife Sites resulting from development provided for by the LRFIP

5.3 WATER

5.3.1 The Water Framework Directive 2000

Since 2000, Water Management in the EU has been directed by the Water Framework Directive 2000/60/EC (WFD). The WFD has been transposed into Irish legislation by the European Communities (Water Policy) Regulations 2003 (SI No. 722 of 2003), as amended. The WFD requires that all member states implement the necessary measures to prevent deterioration of the status of all waters – surface, ground, estuarine and coastal – and protect, enhance and restore all waters with the aim of achieving good status by 2015.

5.3.2 Quality Standards for Surface Waters

The European Communities Environmental Objectives (Surface Waters) Regulations 2009 (SI No. 272 of 2009) is the final major piece of legislation needed to support the WFD and gives statutory effect to Directive 2008/105/EC on environmental quality

5. Envrionmental Protection Objectives

standards in the field of water policy. The Surface Waters Regulations also give further effect to the WFD, establishing a framework for Community action in the field of water policy and Directive 2006/11/EC on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community.

The Surface Waters Regulations apply to all surface waters – including lakes, rivers, canals, transitional waters, and coastal waters – and provide, inter alia, for:

- The establishment of legally binding quality objectives for all surface waters and environmental quality standards for pollutants;
- The examination and where appropriate, review of existing discharge authorisations by Public Authorities to ensure that the emission limits laid down in authorisations support compliance with the new water quality objectives/standards;
- The classification of surface water bodies by the EPA for the purposes of the Water Framework Directive;
- The establishment of inventories of priority substances by the EPA, and;
- The drawing up of pollution reduction plans by coordinating local authorities (in consultation with the EPA) to reduce pollution by priority substances and to cease and/or phase out discharges, emissions or losses of priority hazardous substances.

In order to satisfy the overall WFD objective of 'good status', a surface water body must achieve the requirements of the good ecological and chemical status.

5.3.3 Quality Standards and Threshold Values for Ground Water

Detailed provisions to achieve the aims of the WFD for ground water have been presented in a Groundwater Directive (Directive 2006/118/EC on the protection of groundwater against pollution and deterioration). This Directive sets up environmental objectives of good groundwater quantity and good groundwater quality (chemical status), as well as ensuring a continuity to the 1980 Groundwater Directive (Directive 80/68/EEC on the protection of groundwater against pollution caused by dangerous substances) which is due to be repealed under the WFD by the end of 2013.

Article 3 of the 2006 Directive requires that the assessment of the chemical status of groundwater use both quality standards identified in Annex I of the Directive and threshold values to be set by individual member states. Groundwater quality standards are environmental quality standards expressed as the concentration of a particular pollutant, group of pollutants or indicator of pollution in groundwater, which should not be exceeded in order to protect human health and the environment. Annex I of the Directive sets standards for two pollutants: Nitrates - 50mg/l - and; Active substances in pesticides, including their relevant metabolites, degradation and reaction products - 0,1 µg/l and 0,5 µg/l (total). Irish groundwater threshold values are currently in the process of being set by the EPA.

5.3.4 Quality Standards for Drinking Water

The European Communities (Drinking Water) (No. 2) Regulations 2007, (S.I. No. 278 of 2007) is the primary legislation covering drinking water in Ireland. These regulations prescribe quality standards to be applied and related supervision and enforcement procedures in relation to supplies of drinking water, including requirements as to sampling frequency, methods of analysis, the provision of information to consumers and related matters. The Regulations update and replace the European Communities (Drinking Water) Regulations of 2000 (S.I. No. 439 of 2000), and the European Communities (Drinking Water) Regulations of 2007 (S.I. No. 106 of 2007).

The Environmental Protection Agency (EPA) is the regulatory body charged with monitoring and reporting on compliance levels on matters of water quality in Ireland. They assess the wholesomeness of drinking water, and undertake technical audits of water suppliers to examine all aspects of water quality, treatment and monitoring.

5.3.5 EPOs Indicators and Targets

EPO		Indicator	Target
W1	To prevent impacts upon the status of any waters in line with the recommendations outlined in the Shannon River Basin Management Plan.	Classification of overall status under the European Communities Environmental Objectives (Surface Waters) Regulations 2009 and the classification of quality standards and thresholds under the Groundwater Directive 2006/118/EC	Not to cause deterioration in the status of any water or affect the ability of any water to achieve 'good status' by 2015.
W2	To ensure an adequate supply of potable drinking water	Classification of overall standard under the European Communities (Drinking Water) (No. 2) Regulations 2007	Not to cause deterioration in the quality of drinking water and to increase quality of provision and supply where required.
W3	To reduce and manage the risk of flooding	Extent of development permitted within areas identified as being located within Flood Zone A or B.	Not to provide for additional and surplus housing and commercial development in areas vulnerable to flooding (Zones A & B)

5.4 POPULATION AND HUMAN HEALTH

5.4.1 Introduction

The impact of implementing the LRFIP on population and human health will be determined by the impacts which the LRFIP will have upon environmental vectors. Such potential actual and/or perceived impacts could include temporary demolition and construction noise and spillages which impact upon waters.

However there are also potential impacts associated with changes to population structure and community structures. The specific aims of LRFIP are to amongst others enhance and improve quality of life in the regeneration areas and whilst this can be achieved in part through physical regeneration, extensive social and economic intervention is also required. Facilitating mixed use neighbourhoods, including social mix and tenure diversification, at sustainable densities that encourages the efficient use of urban land is as important as the physical improvements and measures proposed within the LRFIP. The effects of continuous demolition on existing society and neighbourhoods should also be assessed although this has proved quite difficult due to a lack of monitoring data. Little information is available on families that have been already relocated out of the regeneration areas.

There are currently no established or adopted indicator or threshold values in Ireland measuring quality of life. The Census of Population and in particular the Small Area Population Statistics however does provide valuable information on population trends, social composition, health and well being. A detailed socio economic analysis of the regeneration areas, primarily based on Census of Population information was undertaken in the preparation of the LRFIP and this information will be valuable in monitoring potential impacts arising from the proposed regeneration works.

5.4.2 EPOs Indicators and Targets

EPO		Indicator	Target
PH1	To protect and enhance people's quality of life based on high quality residential, community, working and recreational environments and on sustainable travel patterns.	Comparison of Census of Population and Small Area Population Statistics 2011 with new Census data to be gathered in 2016 with particular reference to population, house type, household by type, house ownership and means of travel.	To increase existing residential densities within the regeneration area. To diversify existing housing mix To increase the number of private dwellings. To grow population in line with the core strategy as set out in the City Development Plan To increase the use of public transport, walking and cycling

5.5 CULTURAL HERITAGE

5.5.1 Archaeological Heritage

Valletta Convention 1992

The European Convention on Protection of the Archaeological Heritage known as the Valletta Convention of 1992. This was ratified by Ireland in 1997 and requires that appropriate consideration be given to archaeological issues at all stages of the planning and development process.

National Heritage Plan for Ireland 2002

The core objective of the National Heritage Plan for Ireland 2002 is to protect Ireland's heritage.
In this regard the polluter pays and the precautionary principle are operable.

National Monuments Acts

Archaeology in Ireland is protected under the National Monuments Acts 1930 to 2004. Recorded monuments are protected by inclusion on the list and marked on the map which comprises the Record of Monuments and Places (RMP) set out County by County under Section 12 of the National Monuments (Amendment) Act, 1994 by the Archaeological Survey of Ireland. The definition includes Zones of Archaeological Potential in towns and all other monuments of archaeological interest which have so far been identified.

5.5.2 Architectural Heritage

Planning and Development Act 2000
Records of Protected Structures (RPSs) are legislated for under Section 51 of the Planning and Development Act 2000 and include structures which form part of the architectural heritage and which are of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest.

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5.5.3 EPOs Indicators and Targets

EPO		Indicator	Target
CH1	To avoid unauthorised impacts upon archaeological heritage (including entries to the RMP) and architectural heritage (including entries to the RPSs)	Number of unauthorised developments occurring which result in full or partial loss to entries to the RMP and RPS and the context of the above within the surrounding landscape where relevant, resulting from development provided for by the LRFIP	No unauthorised developments occurring which result in full or partial loss to entries to the RMP and RPS and the context of the above within the surrounding landscape where relevant, resulting from development provided for by the LRFIP

5.6 SOILS AND GEOLOGY

5.6.1 Soil, Mineral and Land Sterilisation

Article 5 of t the Soil Directive states that, for the purposes of preserving the various functions of soil, sealing (the development of artificial surfaces on top of soil resources) should be limited. The proposed Directive also states that soil should be used in a sustainable manner which preserves its capacity to deliver ecological, economic and social services, while maintaining its functions so that future generations can meet their needs.

Development in general including the provision of buildings, infrastructure and recreational facilities and can result in the sealing off or sterilisation of soil and mineral resources. In addition, sterilisation and compaction of topsoil could alter the infiltration and drainage characteristics of the soils.

5.6.2 Regeneration Works

Renovation of existing dwellings and replacement of existing homes in situ will minimise the need for development on greenfield land. Existing roads and infrastructure will ensure that new development may be more easily integrated into the existing environment.

5.6.3 EPOs Indicators and Targets

EPO		Indicator	Target
S1	To minimise effects upon the sustainable use of land, mineral resources or soils	The number of houses being demolished versus the number of houses undergoing refurbishment. The area of brownfield land under development and the area of development on previously undeveloped greenfield sites.	To maximise the opportunities associated with refurbishment of houses and to minimise the number of demolitions. To focus development on brownfield sites and to minimise the extent of development on greenfield land.

5.7 AIR AND CLIMATIC FACTORS

5.7.1 Air Quality Framework Directive

The Air Quality Framework Directive 96/62/EC has been transposed into Irish Law by the Air Quality Standards Regulations 2002 and the Ozone Regulations 2004. The Air Quality Standards Regulations have recently been replaced by the Clean Air for Europe (CAFÉ) Directive 2008 (2008/50/EC) which sets out the requirements for monitoring pollutants and the target values for each pollutant.

5.7.2 Kyoto Protocol

Ireland ratified the UN Framework Convention on Climate change in 1994 and the Kyoto Protocol in 1997. Ireland gave an undertaking to limit the net growth of GHG to 13% above 1990 levels by the period 2008-2012 and successfully met this target. For the period beyond 2012 the EU Councils of Ministers has agreed to an ambitious target of 20% reduction on 2005 GHG emissions levels, possibly increasing to 30% depending on other developed countries agreements.

5.7.3 National Renewable Energy Action Plan

The National Renewable Energy Action Plan (submitted under Article 4 of Directive 2009/28/ EC) sets out Ireland's national trajectories for the share of energy from renewable sources consumed in transport, electricity and heating and cooling between now and 2020.

5.7.4 EPOs Indicators and Targets

EPO		Indicator	Target
AC1	To assist and facilitate the achievement of higher level targets contained in the targets relating to the Kyoto Protocol	Number of houses renovated and retrofitted to BER C rating. Comparison of Census of Population and Small Area Population Statistics 2011 with new Census data to be gathered in 2016 with particular reference to means of travel.	All housing within the regeneration areas have as a minimum a BER C rating. Provide cycleways and increase number of pedestrian links within and throughout the regeneration areas

5.8 NOISE

5.8.1 Environmental Noise Regulations 2006

The Environmental Noise Directive (2002/49/EC) aims to put in place a European wide system for identifying sources of Environmental noise, informing the public about relevant noise data and taking the necessary steps to avoid, prevent or reduce noise exposure. Arising from this Directive the Environmental Noise Regulations, relating to the assessment and management of environmental noise came into effect in 2006.

5.8.2 Limerick City Development Plan 2010 - 2016

There are no statutory noise limits currently in place in Ireland. However the Limerick City Development Plan does state that the noise level arising from any commercial development should not exceed 55dB LAeq during the daytime, and 45dB LAeq during the night, when measured at the site boundary.

In the absence of statutory noise limits regard is had to the World Health Organisation (WHO) Guidelines for Community Noise (1999) which provides community noise exposure recommendations. The NRA (National Roads Authority) has also issued Guidelines for the Treatment of Noise and Vibration in National Road Schemes and has indicated typically deemed acceptable noise levels at the façade of dwellings during construction

5.8.3 EPOs Indicators and Targets

EPO		Indicator	Target
N1	To maintain and, where possible, improve acoustical quality for the current and future residents of the regeneration area.	Noise limits as set out in the World Health Organisation (WHO) Guidelines for Community Noise (1999) and the NRA Guidelines for the Treatment of Noise and Vibration in National Road Schemes	All residential development to have a high quality internal environment in accordance with acceptable noise levels

5.9 LANDSCAPE AND AMENITY

5.9.1 Relevant Issues

There is currently no published national landscape mapping for Ireland. Draft Guidelines on Landscape and Landscape Assessment were issued in 2000 and a consultation paper was issued in 2011 by the Department of Arts Heritage and the Gaeltacht in relation to the preparation of a Landscape Strategy for Ireland. Such draft guidance and policy documents seeks to highlight what are important considerations from a landscape perspective and promotes sensitive siting and design of structures and buildings.

Perhaps the greatest issue within the regeneration areas relates to amenity provision and specifically the provision of useable and practical open space and amenity areas preserving and enhance linkages in city landscape and supporting wildlife corridors and riverine zones.

5. Envrionmental Protection Objectives

5.9.2 EPOs Indicators and Targets

EPO		Indicator	Target
LA1	To conserve and enhance valued natural landscapes and features within them including those of geological value.	Number of complaints received from statutory consultees regarding avoidable impacts on the landscape resulting from development provided for by the LRFIP	No avoidable impacts on the landscape resulting from development provided for by the LRFIP

5.10 MATERIAL ASSETS

5.10.1 Limerick City – Ireland's Smarter Travel Demonstration City 2012 – 2016

Limerick City has been designated as one of three Smarter Travel Demonstration Areas in Ireland. The central aim of Limerick Smarter Travel is to reduce car usage from 51% to 37% by 2016 while increasing cycling from 3% to 14%. The key objective of the Limerick Smarter Travel proposal is to connect four key hubs within the boundaries of Limerick City and Limerick County, getting citizens in these areas to use sustainable modes of transport. The four key hubs are Castletroy, Corbally, the city centre, and Southill. Whilst it is acknowledged that car ownership within the Regeneration Areas is low and the use of public transport, particularly in Southill, is high, there still remains significant opportunities to not only further increase the numbers of people traveling on foot or using public transport, but also to reconnect the Regeneration Areas with the city.

5.10.2 Replacement Waste Management Plan for the Limerick/Clare/Kerry Region 2006-2011

The Replacement Waste Management Plan for the Limerick/Clare/Kerry Region 2006-2011 sets out the current regional policy framework to progress the sustainable management of waste arising in the region to 2011. The strategy in the Waste Plan aims to promote waste prevention and awareness, deliver maximum recyclings and by doing so minimize the use of landfill disposal. Targets of 45% recycling, 41% thermal treatment and 14% disposal were set. An Evaluation of the Replacement Waste Management Plan for the Limerick/Clare/Kerry Region 2006-2011 was undertaken and concluded that a new Waste Management Plan be prepared.

5.10.3 EPOs Indicators and Targets

EPO		Indicator	Target
MA1	To reduce traffic levels by encouraging modal change from car to more sustainable modes of transport such as public transport, walking & cycling	Comparison of Census of Population and Small Area Population Statistics 2011 with new Census data to be gathered in 2016 with particular reference to means of travel.	Provide cycleways and increase number of pedestrian links within and throughout the regeneration areas
MA2	To reduce the generation of waste and adopt a sustainable approach to waste management	Number of houses provided with or retrofitted with facilities for the storage and segregation of waste pending removal. Quantity of demolition material generated from regeneration areas that can be recycled and reused in regeneration building programme.	All houses to be provided with facilities for the storage and segregation of waste pending removal. Prepare and implement a waste recycling plan for the regeneration area.

6. Description of Alternative Scenarios

6.1 INTRODUCTION

The SEA Directive requires that reasonable alternatives (taking into account the objectives and the geographical scope of the LRFIP) are identified described and evaluated for their likely significant effects on the environment. This section identifies and describes different alternative development scenarios, taking into account higher level objectives.

The scenarios are evaluated in Section 7.0. The provisions of the LRFIP which are required to realise the selected alternative are evaluated in Section 8. Mitigation measures to prevent or reduce significant adverse effects posed by the LRFIP are identified in Section 9 – these have been integrated into the LRFIP.

6.2 DEVELOPMENT SCENARIOS

The following summarises 3 'Scenarios' for future development within the regeneration areas. These are neither predictions nor preferences but rather simply offer a range of plausible narratives of the outcome of different planning and economic development policies. These provide the basis for a comparative evaluation of the likely environmental effects of each scenario, which in turn allows the identification of features of the scenarios which are likely to be sensitive or robust over the widest range of circumstances.

Scenario 1 Business as Usual

This scenario seeks to work under the existing statutory provisions of the Limerick City Development Plan 2010 – 2016 (CDP). The CDP sets out Limerick City Council's policies for the development of Limerick City to 2016 and beyond including the regeneration areas. The CDP strongly supports ongoing regeneration in the city and the work of all of those involved. It has two strong policies which seeks to support the implementation of the Regeneration Programme in a coordinated and sustainable manner and to co-operate with the Office of Regeneration and the other agencies in the region to deliver the goals and objectives set out in the Regeneration Programme (policy RG1). It also seeks to zone the regeneration areas in a flexible manner to facilitate the delivery of the master plans (policy RG.2).

The CDP is very clear in its support for regeneration but specifically requests that Framework Implementation Plans are prepared for the four areas setting out the key priorities that will guide development in the future. Whilst it acknowledges that the priorities shall differ for each of the areas it does request that a number of principles are incorporated into the FIP including the requirement for environmental assessments, economic strategies, permeability plans, design codes and sustainable energy initiatives.

Scenario 2 Existing Masterplans

This scenario proposes to continue to work with the two separate masterplans prepared for the Northside and Southside Regeneration Areas in 2008. Developed at a time of budgetary surplus rather than the record deficits currently encountered the masterplans proposed the demolition of all housing, community and retail facilities and their replacement with new, better quality neighbourhoods. The Masterplans prepared in 2008 focused on physical regeneration measures in isolation and did not include social or economic frameworks.

Scenario 3 Preparation of a Framework for the

sustainable regeneration of St. Mary's Park, Moyross, Ballinacurra Weston and Southill

The preparation of a Framework Plan would provide an updated strategy on how the area should be developed and regenerated in line with best sustainable practice and having regard to the social, economic and physical needs of the residents. The Framework Plan allows for a closer and more in-depth analysis of the regeneration areas, and would focus on the existing and future housing stock needs, landuses, connections, environmental impacts, social needs and economic requirements. The Framework Plan would provide a structured and coherent plan to deliver necessary physical, social and environmental infrastructure for the regeneration area.

7. Evaluation of Alternative Scenarios

7.1 INTRODUCTION

This section determines the relative merits of the three alternative scenarios described in Section 6 for the regeneration of four identified areas in Limerick city through a succinct and focused evaluation. This determination identifies the interactions between each of the scenarios and the receiving environment as well as compliance with national, regional and local planning and economic development policy.

7.2 METHODOLOGY

7.2.1 Use of Baseline

The written description and supporting maps of the environmental baseline in Section 4 of this ER are used in the evaluation. Maps were overlaid to identify areas of environmental sensitivities in order to indicate the spatial distribution of ecological sensitivities, flood zone areas and landscape sensitivities. This approach then facilitated the identification of locations with possible future development opportunities where development would be likely to be more easily absorbed. The Overlay Mapping and the mapping of individual environmental components were considered by the Office of Regeneration during the preparation of the LRFIP.

7.2.2 Use of Envrionmental Protection Objectives

The Environmental Protection Objectives (EPOs) which are identified in Section 5 are also used for the evaluation. The scenarios are evaluated using compatibility criteria (Table 7.1) in order to determine how they are likely to affect the status of these EPOs.

Table 7.2 collates all the EPOs which have been developed from international and national policies which generally govern environmental protection objectives. The EPOs and the three scenarios are arrayed against each other to identify which interactions – if any – would cause impacts on specific components of the environment. Where the appraisal identifies a likely conflict with the status of an EPO the relevant EPO code is entered into the conflict column.

Symbol	Impact on the Environment
+	Potentially Significant Beneficial Impact on the status of the Envrionmental Protection Objective
-	Potentially Significant Adverse Impact on the status of the Envrionmental Protection Objective
o	No Relationship with, or an Insignificant Impact on, the status of the Envrionmental Protection Objective

Table 7.1 Criteria for appraising the effect of Alternatives and LRFIP provisions on EPOs

B1	To ensure compliance with the Habitats Directive with regard to the protection of Natura 2000 Sites and Annexed habitats and species
B2	To effectively manage other environmental features and maintain wildlife corridors which are of major importance for wild fauna and flora and essential for the migration and dispersal of wild species
B3	To avoid significant impacts on relevant habitats, species, environmental features or other sustaining resources in Wildlife Sites.
W1	To prevent impacts upon the status of any waters in line with the recommendations outlined in the Shannon River Basin Management Plan.
W2	To ensure an adequate supply of potable drinking water
W3	To reduce and manage the risk of flooding
PH1	To protect and enhance people's quality of life based on high quality residential, community, working and recreational environments and on sustainable travel patterns.
CH1	To avoid unauthorised impacts upon archaeological heritage (including entries to the RMP) and architectural heritage (including entries to the RPSs)
S1	To minimise effects upon the sustainable use of land, mineral resources or soils
AC1	To assist and facilitate the achievement of higher level targets contained in the targets relating to the Kyoto Protocol
N1	To maintain and, where possible, improve acoustical quality for the current and future residents of the regeneration area.
LA1	To conserve and enhance valued natural landscapes and features within them including those of geological value.
MA1	To reduce traffic levels by encouraging modal change from car to more sustainable modes of transport such as public transport, walking & cycling
MA2	To reduce the generation of waste and adopt a sustainable approach to waste management

Table 7.2 Collation of SPOs from international and national policies

7.3 EVALUATION OF ALTERNATIVE SCENARIOS

Table 7.3 below provides an evaluation of each of the three development scenarios against the Envrionmental Protection Objective (EPOs).

7.3.1 Scenario 1: Business as Usual

Although the zoning set out in the Limerick City County Development Plan 2010 – 2016 (CDP) covers all components needed to physically regenerate the four identified areas into functioning neighbourhoods the detail would be at the broad scale and does not provide an integrated programme of physical, social and economic improvements. In the absence of an integrated and detailed programme it is likely that the programme of regeneration would become market driven and not necessarily be plan led which would be contrary to the proper planning and sustainable development of the area. A detailed programme of refurbishment, demolition and new build is required based on housing needs analysis and this needs to be considered in the context of creating a more attractive physical environment and the reconsideration of the existing layouts, linkages, connections and open spaces. The CDP does not contain the necessary programme to deliver works in consultation with the community and availability of funding. Proceeding under the CDP would potentially give rise to ad-hoc and incremental development but it would also likely involve less new projects with less potential environmental effects. This scenario would lead to a lack of certainty for the existing residents of the area and leave them without a framework for input to take on board community issues. Connections between communities in the area would not be provided for and it would also lead to unsustainable travel patterns.

This scenario would not be in compliance with the objectives of the CDP which requires the preparation of Framework Plans for the regeneration areas. It would further be contrary to the key objective set out under the National Housing Policy Statement 2011 which seeks to improve the quality of existing social housing stock through regeneration and improvement works programmes, and the return of vacant stock to effective use within the shortest timeframes possible.

7.3.2 Scenario 2: Existing Masterplans

The Masterplans prepared in 2008 focused on physical regeneration measures in isolation and did not adopt an integrated approach to include social or economic frameworks. These plans solely focused on complete demolition and the development of new neighbourhoods which would have resulted in extensive displacement of the population and resultant disturbance to community life. Significant demolition waste would also have been generated contrary to the objectives of the Replacement Waste Management Plan for Limerick/Clare/Kerry Region 2006 – 2011. The Masterplans were not designed to deal with the current issues facing the area. Furthermore, the lack of a phasing strategy or an implementation plan would have a negative impact on both the current and future residents of the area and the overall environment.

The masterplans were not prepared under the guidance of strategic environmental assessment and so proposals to develop areas within existing floodplains and in proximity to designated sites were not fully evaluated and could be contrary to international and national environmental legislation Similar to scenario 1, this scenario would be contrary to the key objective set out under the National Housing Policy Statement 2011

7.3.3 Scenario 3: Preparation of a Framework for the Sustainable Regeneration of St. Mary's Park, Moyross, Ballinacurra Weston and Southill

This scenario is loosely based on strategic objectives of the 2008 Masterplan and complies with the requirement in the CDP that detailed framework plans be prepared for the regeneration areas. This scenario therefore amalgamates parts of both of the previous options. The Framework Plan allows for a more in-depth analysis of the regeneration areas and provides a realistic strategy from which to aid the regeneration in a structured and coherent manner.

This scenario developed in consultation with the local communities focuses more on refurbishment and only proposes demolition where necessary having regard to the structural integrity of the property, the need to facilitate connectivity, or the need to create useable open spaces. Such an approach will reduce the quantity of waste material generated from the regeneration programme in accordance with the principles of sustainability and the provisions of the Replacement Waste Management Plan for Limerick/Clare/Kerry Region 2006 – 2011. The Framework Plan also seeks a proactive approach to environmental challenges including flooding and energy efficiency and adopts a holistic approach to reintegrating these areas back into the wider city. The phased delivery of development options is key to implementation of the Framework Plan thereby limiting disturbance to the resident population and surrounding environment.

7. Evaluation of Alternative Scenarios

Table 7.3 Evaluation of each of the three development scenarios against the EPOs.

Environmental Receptor	Environmental Protection Objectives	Scenario 1 Business as Usual	Scenario 2 Existing Masterplans	Scenario 3 New Framework Plan
Biodiversity Flora & Fauna	B1 To ensure compliance with the Habitats Directive with regard to the protection of Natura 2000 Sites and Annexed habitats and species	- This scenario would predominately result in individual planning applications being assessed in isolation and without due cognisance given to the role of biodiversity.	- + The Masterplan would not have been informed by the SEA process or the requirements of the Habitats Directive.	+ The LRFIP would aim to balance the regeneration needs with the protection and enhancement of the environment.
	B2 To effectively manage other environmental features and maintain wildlife corridors which are of major importance for wild fauna and flora and essential for the migration and dispersal of wild species	- Although the CDP promotes wildlife corridors in existing natural and undisturbed areas it does not seek to create such a resource within existing urbanised areas such as the regeneration areas. There would therefore be potential for a lack of joined up thinking in relation to the creation of green routes and corridors which would enhance biodiversity value in the regeneration areas.	- The Masterplan was based on principles of urban design and movement with significant demolition proposed. Little cognisance was given to the protection of biodiversity/flora & fauna apart from the River Shannon and its designated sites.	+ The LRFIP would seek to enhance biodiversity value with the reconfiguration of existing open space provision providing opportunities to develop green corridors and networks as part of a co-ordinated approach.
	B3 To avoid significant impacts on relevant habitats, species, environmental features or other sustaining resources in Wildlife Sites.	- With increase in construction there is a likelihood that permeable landscapes are converted to hard surfaces which may lead to alteration and direct loss of habitat unless mitigated against.	+ With increase in construction there is a likelihood that permeable landscapes are converted to hard surfaces which may lead to alteration and direct loss of habitat unless mitigated against. However the Masterplan proposed demolition in the first instance and then construction thereby effectively developing on already urbanized land and reducing consequential impacts on biodiversity.	+ With increase in construction there is a likelihood that permeable landscapes are converted to hard surfaces which may lead to alteration and direct loss of habitat unless mitigated against. However the LRFIP proposes demolition in the first instance and then construction thereby effectively developing on already urbanized land and reducing consequential impacts on biodiversity.

Environmental Receptor	Environmental Protection Objectives	Scenario 1 Business as Usual	Scenario 2 Existing Masterplans	Scenario 3 New Framework Plan
Water	W1 To prevent impacts upon the status of any waters in line with the recommendations outlined in the Shannon River Basin Management Plan.	o+ Existing legislation and relevant statutory plans including the Shannon River Basin Management Plans and additional policies in the Limerick City Development Plan 2010-2016 will provide for significant protection and enhancement of water quality.	o Existing legislation and relevant statutory plans including the Shannon River Basin Management Plans will provide for significant protection and enhancement of water quality.	o+ Existing legislation and relevant statutory plans including the Shannon River Basin Management Plans and additional policies in the LRFIP will provide for significant protection and enhancement of water quality.
	W2 To ensure an adequate supply of potable drinking water	o Neutral impact on the provision of adequate water distribution and drainage networks	o Neutral impact on the provision of adequate water distribution and drainage networks	o + Neutral impact on the provision of adequate water distribution and drainage networks, but the LRFIP does contain proposals to upgrade the existing water network in St. Mary's Park as refurbishment works are proposed.
	W3 To reduce and manage the risk of flooding	+ Development focused in designated and established areas whilst avoiding areas at risk of flooding. Up to date guidelines such as the OPW issued guidelines "The Planning System and Food Risk Management" would be used in the assessment of planning applications.	- Urban design strategy designed and established prior to the implementationof OPW issued guidelines "The Planning System and Food Risk Management". Potential for development in flood risk areas	+ Development focused in designated and established areas whilst avoiding areas at risk of flooding. Up to date guidelines such as the OPW issued guidelines "The Planning System and Food Risk Management" would be used in the assessment of planning applications.
Population	PH1 To protect and enhance people's quality of life based on high quality residential, community, working and recreational environments and on sustainable travel patterns.	- An integrated programme of physical, social and economic measures would not be delivered under this scenario as the zoning provisions in the Plan would be too broad. This scenario would be devoid of the detailed analysis required to deliver effective regeneration in consultation with the community.	- This scenario would likely have a negative impact on population/human health as the original Masterplans would have resulted in significant displacement of the local community with little regard to their economic and social needs. Given the economic downturn and the need for more integrated planning and development from a social and economic perspective it is felt that the Masterplans would not be robust enough to meet the needs/requirements of the existing and future residents of the area.	+ The LRFIP would allow for a more in-depth analysis of the regeneration areas and provide a realistic strategy from which to aid the regeneration in a structured and coherent manner. Developed in consultation with the local communities the LRFIP would clearly set out a phased delivery plan across all sectors and would look holistically at the physical issues including linkages and connections, improvements to the built fabric, density, employment and access.

Table 7.3 Evaluation of each of the three development scenarios against the EPOs.*(Continued)*

7. Evaluation of Alternative Scenarios

Environmental Receptor	Environmental Protection Objectives	Scenario 1 Business as Usual	Scenario 2 Existing Masterplans	Scenario 3 New Framework Plan
Cultural Heritage	CH1 To avoid unauthorised impacts upon archaeological heritage (including entries to the RMP) and architectural heritage (including entries to the RPSs)	o Existing legislation and relevant statutory plans will provide for significant protection and enhancement of archaeological and architectural heritage.	o Existing legislation and relevant statutory plans including will provide for significant protection and enhancement of archaeological and architectural heritage.	+ The LRFIP would allow for greater investment and initiatives for the enhancement and appropriate use of the areas built heritage balanced with the need to protect its cultural character particularly around St. Mary's Park.
Soils & Geology	S1 To minimise effects upon the sustainable use of land, mineral resources or soils	- The lack of an over arching framework plan for the area would most likely concentrate development on easier greenfield sites as opposed to more complicated brownfield site.	- + A programme of demolition and rebuild would concentrate development away from greenfield land but could substantially modify soil conditions and natural drainage qualities in the area of development.	+ A programme of refurbishment, demolition and replacement housing would allow for sustainable reuse of underutilised/ vacant brownfield sites which currently exist in the area whilst avoiding greenfield sites where possible.
Air & Climatic Factors	AC1 To assist and facilitate the achievement of higher level targets contained in the targets relating to the Kyoto Protocol	- Refurbishment of existing houses is not promoted in the development plan and therefore new build could lead to greater CO_2 emissions. Under Existing housing in the regeneration area would not be refurbished to a BER C energy rating standard. With no detailed transport strategy specific to the regeneration area the potential to increase other modes of travel other than the car would be minimal.	- Focusing on total demolition and new build would give rise to significant dust and CO_2 emissions. The limited houses remaining in the regeneration area would not be refurbished or retrofitted to a BER C energy rating standard. With no detailed transport strategy the potential to increase other modes of travel other than the car would be minimal.	+ The LRFIP proposes a significant refurbishment strategy thereby increasing the energy rating on all housing within the regeneration area to a minimum of BER C rating. The LRFIP would also contain a detailed transport strategy that seeks to improve linkages and connectivity thereby encouraging greater walking and cycling in the area and reducing the need to travel by car.
Noise	N1 To maintain and, where possible, improve acoustical quality for the current and future residents of the regeneration area.	- + Although framed within a wider transport strategy for the city, the lack of a robust and detailed transport strategy specific to the regeneration area would potentially lead to unsustainable travel patterns if transport infrastructure necessary to support development is not provided. This would lead to longer journeys being undertaken potentially in more unsustainable modes of transport.odes of transport.	- The lack of a robust and detailed transport strategy would potentially lead to unsustainable travel patterns if transport infrastructure necessary to support development is not provided. This would lead to longer journeys being undertaken potentially in more unsustainable modes of transport.	+ - Improvements and efficiencies in the existing road network and access routes in the regeneration would lead to more sustainable travel patterns and contribute to a reduction in the use of the private car. There may be an increase in noise levels for some residents as the LRFIP would seek to enhance and develop the existing road network, if not mitigated against.

Table 7.3 Evaluation of each of the three development scenarios against the EPOs.*(Continued)*

Environmental Receptor	Environmental Protection Objectives	Scenario 1 Business as Usual	Scenario 2 Existing Masterplans	Scenario 3 New Framework Plan
Landscape and Amenity	LA1 To conserve and enhance valued natural landscapes and features within them including those of geological value.	- + Although the Development Plan has strong landscape policies it is considered that the lack of an over arching framework for the area and the assessment of planning applications in isolation would potentially have a negative impact on the collective benefits of the natural landscapes or result in a loss of natural elements of the landscape.	- + The Masterplan was based on principles of urban design and movement with significant demolition proposed. Little cognisance was given to the collective benefits of the natural landscapes or result in a loss of natural elements of the landscape.	- + The LRFIP would take a holistic approach to development and focuses on protection of the landscape and concentrates efforts on providing meaningful public open space through the collective consideration of natural landscapes. In the interest of creating more practical and pragmatic functioning neighbourhoods the LRFIP does seek to provide dedicated linkages through historic areas of open space which may be negatively viewed by some of the community.
Material Assets	MA1To reduce traffic levels by encouraging modal change from car to more sustainable modes of transport such as public transport, walking & cycling	- + Although framed within a wider transport strategy for the city, the lack of a robust and detailed transport strategy specific to the regeneration area would result in individual planning applications being assessed in isolation.	- The lack of a robust and detailed transport strategy specific to the regeneration area but in the context of the wider city would result in individual planning applications being proposed in isolation.	+ A key element of the LRFIP would be to deliver a transport and movement strategy which would seek the opening of connections, in particular walking and cycling routes allowing for greater connectivity within the regeneration areas.
	MA2 To reduce the generation of waste and adopt a sustainable approach to waste management	o + Existing policies and objectives in the development plan promotes and adopts a sustainable approach to waste management.	- The significant programme of demolition proposed in the Masterplan would have adverse impacts on the generation of demolition waste in the region.	- + The LRFIP would concentrate on a balanced programme of refurbishment, demolition and waste thereby still contributing to demolition waste in the region. However, it would seek to adopt a proactive and practical approach to waste management in its refurbishment and new build programme.

Table 7.3 Evaluation of each of the three development scenarios against the EPOs.*(Continued)*

7.4 PREFERRED ALTERNATIVE

Based on the analysis of the alternative scenarios as detailed in Table 7.3 and the foregoing analysis the preparation of a framework for the sustainable regeneration of St. Mary's Park, Moyross, Ballinacurra Weston and Southill was selected as the preferred approach. This approach was selected as it was considered to best conform to international and national legislation and policy, thereby ensuring minimal impact on the environment. This approach has been found to have the most positive impact on the environment.

8. Evaluation of LRFIP Provisions

8.0 EVALUATION OF LRFIP PROVISIONS

8.1 INTRODUCTION

This section of the Environmental Report evaluates the provisions of the LRFIP and should be read in conjunction with the Evaluation Matrix set out in Appendix A. This evaluation assesses the likely or potential significant effects on the environment of implementing the LRFIP. These effects include secondary, cumulative, synergistic, short, medium and long-term permanent and temporary, positive and negative effects.

8.2 EVALUATION METHODOLOGY

The LRFIP is a non-statutory plan but rather acts as a tool for coordinating development and implementing regeneration within four statutorily designated areas within Limerick City. The development measures of the LRFIP were tested against the Environmental Protection Objectives developed earlier in Section 5.0. The Framework Plan does not specifically state policies and objectives but rather puts forward detailed development measures and over arching objectives in order to achieve regeneration.

The assessment of the likely significant effects on the environment of implementing the LRFIP was carried out, in accordance with best practice methodology. The methodology employed was the accepted and commonly used methodology of creating a matrix, whereby development measures contained in the LRFIP area listed on one axis and the environmental protection objectives devised through the SEA process are detailed on the other. It should be noted that all development measures detailed and listed in the LRFIP were not individually assessed. In some instances, collective consideration of a number of similar proposals in different locations, were considered. In other instances, it was considered necessary to evaluate specific and detailed proposals of substantial scale.

To avoid the Environmental Report being dominated by a series of complex matrices these detailed matrices have been included as an appendix in this report (see Appendix A) while a summary of the significant environmental impacts are provided below. Potential beneficial and adverse impacts have been identified in line with the requirements of the SEA Directive. Potential effects of the provisions of the LRFIP have been categorised as potential to have:

- A Significant Beneficial Impact
- An Uncertain Impact on Environmental Receptor
- A Significant Adverse Impact on Environmental Receptor
- An Insignificant Impact or No Relationship

8.2.1 Biodiversity Flora & Fauna

The LRFIP was found largely to have potential for significant beneficial effects on the biodiversity, flora and fauna of the area. The overall approach of the LRFIP is to concentrate new development on infill or underutilised sites within an existing built-up, urban area whilst avoiding more environmentally sensitive and vulnerable sites. A number of potential future projects listed in the LRFIP at this stage are deemed to have an uncertain impact on non designated species and habitats simply because no detailed ecological assessment has been undertaken of the sites at this stage. Until such assessments are undertaken the proposal can not be fully evaluated and the potential impacts remain uncertain.

St. Mary's Park is deemed to be the most sensitive of the four regeneration areas from a biodiversity, flora and fauna perspective having regard to the SAC designation which surrounds the island. Whilst Moyross is touched by both a SAC designation and pNHA designation it is not as extensive as the designation in St. Mary's Park as it lies on the north eastern fringe of the regeneration area. The LRFIP has taken a precautionary approach to such designations such that no development is proposed within designated sites and all development in proximity to a designated site will be subject to project level NIA.

The LRFIP encourages opportunities to protect existing, and create new, habitats through the creation of a multi-functional green network throughout the regeneration area which includes areas of high biodiversity value. Emphasis is also placed on the protection of designated, as well as undesignated sites, of high biodiversity value.
Policies and objectives contained within the plan to increase accessibility generally, including pedestrian and cyclist access, to the River Shannon and areas of natural recreation, could also have potential significant adverse impacts in terms of disturbance, fragmentation or loss of habitats unless mitigated against. See Table 8.1 for a summary of potential impacts of the LRFIP on Biodiversity, Flora and Fauna.

8.2.2 Water

The LRFIP was largely found to have likely significant beneficial impacts on water in the area of water supply through the upgrade of infrastructure in St. Mary's Park, in the area of wastewater treatment as there is adequate capacity to accommodate population growth in the recently upgraded system and in other areas such as greening the landscape and protecting and improving biodiversity and areas of environmental importance.

Much of St. Mary's Park regeneration area is located within flood zone A, along with parts of Moyross and a small area of land located on the northern side of a tributary of the Ballinacurra Creek in Southill. The area of flood risk in Southill is located on the western side of the Rosbrien interchange away from the proposed development works within the LRFIP which are located to the north east of the interchange. In the case of Moyross a precautionary approach has been adopted and future development works within Moyross avoids areas at risk of flooding. Thus it is not proposed to provide for any replacement / new build dwellings within the flood zone with all undeveloped areas within the flood zone remaining as either open space or a greenfield site. It is however proposed to refurbish a number of properties which are already located within but at the edge of the flood zone, namely the eastern and southern extremity of Sarsfield Gardens. However as the works purely comprise refurbishment works and do not comprise new build, the net effects of and to flooding to these properties poses no greater or increased risk than if the properties were not refurbished. In coming to this conclusion it is acknowledged that refurbishment of residential properties in most instances would generally not require the benefit of planning permission and therefore would not be subject to normal planning considerations (including flood risk assessment).

In the case of St. Mary's Park it is proposed to demolish, refurbish and provide infill housing within this regeneration area. Specifically it is proposed to demolish 65 no. homes within Flood Zone A. With reference to Figure 4.5 only 10 no. replacement homes are located within Flood Zone B with 39 no. replacement homes in Flood Zone A. In contrast and with reference to Figure 4.6 a total of 21 no. houses are proposed within Flood Zone C with 28 no. replacement houses in Flood Zone and B. As these lands are being promoted for residential use which is a use that is vulnerable to flooding and is deemed as "highly vulnerable development" as set out in Table 3.1 of the Planning System and Flood Risk Management Guidelines for Planning Authorities, it is necessary to demonstrate 'exceptional circumstances' and apply the Justification Test. The Justification Test in support of the provision of infill residential development in St. Mary's Park is provided for in Appendix 2 and has been deemed to justify the proposed development. A detailed Flood Risk Assessment was also undertaken by Punch Consulting Engineers who recommended that the minimum finished floor levels should be placed at or above 5.35 m. A summary of the justification test is detailed in Table 8.1

Criteria	Determination with Regard to Works in St. Mary's Park
The urban settlement is targeted for growth under the National Spatial Strategy, regional planning guidelines, statutory plans as defined under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act, 2000, as amended.	Yes Limerick City is a designated gateway at national and regional level and is identified to accommodate significant growth in the Limerick City Development Plan 2010 – 2016.
The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and, in particular:	The lands are appropriately zoned for residential use in the CDP and thus have already undergone and passed strategic flood risk assessment. Development on these lands is required to achieve the proper planning and sustainable development of Limerick City.
Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement;	The proposed works are essential to facilitate regeneration within the legally defined regeneration area of St. Mary's Park and to facilitate expansion of the urban settlement.
Comprises significant previously developed and/or under - utilised lands;	All works proposed comprise works on brownfield and / or under-utilised lands.
Is within or adjoining the core of an established or designated urban settlement;	The St. Mary's Park regeneration area adjoins the commercial core of Limerick City and adjoins the Special Planning Control area within King's Island where it is an objective of the CDP to grow and promote the area.
Will be essential in achieving compact and sustainable urban growth;	The proposed works within St. Mary's Park regeneration area and particularly the proposed replacement housing on infill under-utilised and sites is essential in achieving compact and sustainable urban growth.
There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.	There are no other suitable alternative lands in areas at lower risk of flooding within or adjoining the core of the urban settlement.
A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere.	Yes, Strategic Flood Risk Assessment (SFRA) has been undertaken for the works within St. Mary's Park in accordance with The Planning System and Flood Risk Management -Guidelines for Planning Authorities Department of the Environment, Heritage and Local Government and Office of Public Works.

Table 8.1 Justification Test Summary

8.2.3 Population and Health

The development measures set out in the LRFIP have been found to have overall significant beneficial impacts on population and human health. The LRFIP focuses in particular on mechanisms that deliver the necessary physical, social and environmental infrastructure to improve quality of life for residents of the regeneration area. The framework emphasises the need to promote ease of movement both within the regeneration areas but also externally with the wider city. Such improvements are considered to be critical to the overall objectives of the LRFIP which seeks to improve the areas as a place to live and work. In support of this objective the open space and public realm strategy further seeks to improve quality of life through the reconfiguration of unused area of open space, the creation of wildlife corridors and linkages and high quality public open space.

Economic objectives within the LRFIP seek to build employment nodes around key locations that already offer employment opportunities. It further seeks to consolidate activity in an attempt to create synergistic effects and reduce the need to travel. In addition to the economic objectives there is a suite of social interventions proposed that will continue long after the physical regeneration is complete.

8. Evaluation of LRFIP Provisions

Perhaps the only area of uncertainty in terms of impact relates to the housing strategy which on balance and following due consideration must be considered to be a beneficial impact. The LRFIP firstly focuses on a programme of refurbishment and proposes to refurbish 1,054 no. existing units within the regeneration area. It also however proposes a programme of demolition and replacement housing with 605 no. units proposed for demolition (over half of these units are located in Moyross). A housing replacement strategy provides for 581 no. units thereby accommodating those who have been displaced on foot of demolition. Whilst the provision of refurbished houses and new housing is of direct beneficial impact in terms of quality of life, the impacts from a social perspective in terms of temporary and permanent relocation and displacement of people out of their community and the breakdown of community structures have not been fully assessed. However, as mentioned previously on balance the impacts must be considered to be beneficial as the overall quality of life of the environment is improved for the population of the area.

8.2.4 Cultural Heritage

Overall the impacts of the LRFIP were found to have a mixture of potential significant beneficial impacts on the cultural heritage of the area and insignificant impacts. There is a limited amount of archaeological heritage features within the regeneration areas with the exception of St. Mary's Park where the southernmost part of the regeneration area is located within a Zone of Archaeological Potential. There are also a number of recorded monument and protected structures present. However that part of the island where most works are proposed (to existing houses) is located outside of the zone. Further investigation shall be required through Archaeological Impact Assessment to assess the full potential impacts on cultural heritage in these areas.

8.2.5 Soils & Geology

The LRFIP will have overall beneficial impacts on soil and geology. Redevelopment of brownfield sites and underutilised vacant sites are promoted in the LRFIP along with vacant buildings. Limited greenfield development in promoted in the longer term at key locations which would contribute to the overall quality of the built form.

8.2.6 Air & Climatic Factors

Overall the LRFIP will have significant beneficial impacts on air and climatic factors. Air quality in the area is currently good. Emissions from the transport sector are the main threat to air quality.Whilst the LRFIP does propose a number of strategic road connections, the main emphasis in the LRFIP is to improve internal and external connections within the regeneration areas thereby encouraging movement by foot and by bicycle. Car ownership in the regenerations areas is well below the national average and public transport usage is comparable to national figures. Cumulatively all these factors will serve to have significant beneficial impacts on the air quality of the area.

Whilst development projects outlined in the LRFIP will mostly result in increased energy use and production of greenhouse gases, these negative impacts will be offset by the fact that the plan led approach to development is inherently sustainable in terms of energy use. The plan approach is based on the regeneration of the area on a phased basis that makes efficient use of land located in close proximity to existing services and facilities where public transport is provided, thereby reducing the need to travel by private car to less accessible locations on the urban fringe and beyond.

Some short-term impacts on climatic factors will occur (particularly in relation to the emissions of greenhouse gases and use of energy) as a result of increased development and construction but these would not be considered significant. Furthermore regard must be had to the refurbishment strategy which will have a beneficial impact on reducing greenhouse gases as all houses are refurbished to a minimum of a BER C rating.

8.2.7 Noise

Overall the LRFIP will have significant beneficial impacts on noise and maintaining the existing acoustical quality for current and future residents. Traffic noise is the dominant noise source in the area. The emphasis throughout the LRFIP is on reducing the need to travel by private car whilst encouraging and facilitating modal change to more sustainable forms of transport e.g. travel by foot, bicycle and public transport. Whist some temporal noise impacts may arise during demolition and construction these can be mitigated against through the control of hours of work. Thus reducing the need to travel, will serve to have significant beneficial impacts in terms of noise in the area.

8.2.8 Landscape and Amenity

The LRFIP will serve to have potential significant beneficial impacts overall on landscape and amenity. The existing built environment within the regeneration area is visually poor and proposals to refurbish, demolish, restructure and undertake new build will all serve to enhance the visual appearance of the area.

Whilst a reduction in open space provision in Southill may be perceived as a negative impact other external factors must be considered in advance of framing a perspective. Existing open space in Southill stands at 22% of the total regeneration area and given its edge of city location it is considered that such provision is excessive. Existing open space provision is of poor quality, is poorly located, is underutilised and in some instances contributes to anti social behaviour in the area. Reducing open space provision to 12% of total land although significant will result in better quality and useable open space that will contribute to the overall amenity of the area.

Development on open space is being promoted to address existing negative attributes thereby improving overall quality of life so on balance the impacts are likely to be positive to neutral.

8.2.9 Material Assets

Overall the LRFIP will have significant beneficial impacts on transport in the area. The need for a greater modal shift from private car to more sustainable forms of transport is emphasised throughout the framework. The LRFIP also seeks the completion of the internal street networks, improvement in terms of access from residential areas to public transport and the completion of a green route connecting open space amenity.

The LRFIP will serve to have negative to neutral impacts on waste management as the proposal to demolish houses will result in significant adverse impacts from a waste management perspective. However it is considered that such impacts could be mitigated through the implementation of a waste management plan for the physical housing programme in the regeneration area focusing on the recycling and reuse of demolition waste generated by regeneration programme.

8.3 INTERRELATIONSHIP BETWEEN ENVIRONMENTAL COMPONENTS

The SEA Directive requires the ER to include information on the likely significant effects on the environment, including on issues such as biodiversity, fauna, flora, population, human health, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors.
Likely significant effects on environmental components which are identified include those which are interrelated. However implementation of the LRFIP will not affect the interrelationships between these components. The presence of significant interrelationships between environmental components is identified on Table 8.2 below.

8.4 INDIRECT AND CUMULATIVE EFFECTS

Environmental parameters and plans and programmes can not be looked at in isolation. There can be cumulative, secondary and synergistic effects between many of them. Evaluation of the LRFIP provisions in the previous section principally and systematically focus on direct impacts. Indirect and cumulative effects are also considered as they arise throughout the assessment on a case by case basis.

Regeneration measures and specific proposals will potentially, both indirectly and cumulatively, conflict with the protection of various environmental components including ecology, the landscape, cultural heritage, water resources and land resources (this relates to EPOs B1, B2, B3, L1, CH1, PH1, W3, MA1 and MA2). These potential conflicts will be mitigated by measures which have been integrated into the LRFIP through the SEA (see Section 9) and they will be addressed by lower tier environmental assessment, as appropriate.

It is noted that although significant cumulative effects are likely to occur in combination with other policy documents such as the Limerick City Development Plan, the Economic and Spatial Plan for Limerick and the Mid West Regional Planning Guidelines, it is not

Component	Biodiversity, Flora & Fauna	Water	Population	Cultural Heritage	Soils & Geology	Air & Climatic Factors	Noise	Landscape & Amenity	Material Assets
Biodiversity, Flora & Fauna		Yes	No	No	Yes	Yes	No	Yes	No
Water			Yes	No	Yes	No	No	No	No
Population				No	Yes	Yes	Yes	Yes	Yes
Cultural Heritage					No	No	No	Yes	No
Soils & Geology						No	No	Yes	No
Air & Climatic Factors							No	No	Yes
Noise								No	Yes
Landscape & Amenity									No
Material Assets									

Table 8.2 Significant Interrelationships between Environmental Components

8. Evaluation of LRFIP Provisions

possible to identify the spatial location of these precise effects in this assessment due to the strategic nature of the other policy documents. In any case the LRFIP has been prepared in the context of these policy documents and so embraces a lot of their high level objectives and policies from the outset. General situations in which cumulative effects could occur in instances including those where:

- There is a requirement to provide for new infrastructure under another strategic action such as the City Development Plan or the Economic and Spatial Plan for Limerick;
- New or upgraded transport corridors are provided in line with new regeneration works;
- New road infrastructure and new build occur together within or in close proximity to environmental sensitivities;
- An increase in population in the regeneration areas creates a greater demand on external services and facilities resulting in additional development.

Cumulative effects are those that arise when the effects of the implementation of one plan occur in combination with those of other plans or developments. Table 8.2 identifies the principle plans, policies and programmes that are likely to give rise to developments causing effects that could combine or interact with those of the LRFIP. The assessment of the likely combination of effects requires knowledge of the likely effects of all plans/developments under consideration. Table 8.3 describes the extent of knowledge of the likely environmental effects of the implementation of these plans, policies and programmes. This analysis shows that at national level there has been very limited assessment of the likely effects of the types of developments that could occur in combination with the implementation of the LRFIP. It is the sequence of policy assessment that facilitates the assessment of cumulative effects. The absence of these other relevant plans that create context (and their associated assessments) renders it premature – and therefore impractical – to make any meaningful assessment of cumulative effects between national plans or policies and the LRFIP.

Table 8.3 Knowledge of likely effects of other plans with potential to interact with IP effects

Policy, Plan, Programme or Projects	Spatially Specific?	SEA	Environmental Effects Known	Relevance of Policy, Plan, Programme or Project to LRFIP	Interactions resulting in Cumulative Impacts
National					
National Spatial Strategy 2002 – 2020	Yes	No	No	Limerick as a 'Gateway ' is focused for population and economic growth.	Exact interactions unknown but could result in cumulative impacts
National Development Plan 2007 – 2013	No	No	No	The Social Housing Provision and Renewal Sub Programme could have potential impacts.	Exact interactions unknown but could result in cumulative impacts
Towards a New National Climate Policy: Interim Report of the NESC Secretariat 2012	No	No	No	Promotes sustainable neighbourhoods including higher densities and consolidated urban centres.	Exact interactions unknown but could result in cumulative impacts
Transport 21	Yes	No	No	Promotes development of transport infrastructure	Unlikely
National Climate Change Strategy 2007-2012	No	No	No	Promotes achievement of targets agreed under Kyoto Protocol	None
Delivering Homes Sustaining Communities 2007	No	No	No	Effective use of land in the construction of new housing schemes by integrating housing provision with necessary transport, physical and social infrastructure and amenities.	Exact interactions unknown but could result in cumulative impacts
Housing Policy Statement 2011	No	No	No	Objective is to improve the quality of existing social housing stock through regeneration and improvement works programmes, and the return of vacant stock to effective use.	Exact interactions unknown but could result in cumulative impacts

Policy, Plan, Programme or Projects	Spatially Specific?	SEA	Environmental Effects Known	Relevance of Policy, Plan, Programme or Project to LRFIP	Interactions resulting in Cumulative Impacts
Regional					
Shannon River Basin Management Plan	Yes	Yes	Yes	Seeks to maintain good water quality status of the River Shannon and associated water networks.	Impacts arising from interactions are avoided by integration of mitigation measures into the LRFIP
Mid West Regional Planning Guidelines				Promotes Limerick City as Zone 1 where significant population growth should be accommodated and this has implications for the regeneration areas	Impacts arising from interactions are avoided by integration of mitigation measures into the LRFIP
Replacement Waste Management Plan for the Limerick/Clare/Kerry Region 2006-2011	Yes (partial)	Yes	Yes	Provision of waste infrastructure including bring banks and collection centres are promoted within the city and could affect the regeneration areas	Impacts arising from interactions are avoided by integration of mitigation measures into the LRFIP
Mid West Area Strategic Plan	Yes	Yes	Yes	A landuse and transportation strategy which does provide for road construction and road improvement measures within the regeneration areas	Impacts arising from interactions are avoided by integration of mitigation measures into the LRFIP
Limerick & Clare Joint Housing Strategy 2011 - 2017	Yes (partial)	Yes	Yes	The strategy focuses on the regeneration programme and resultant population growth which it states is critical to redirecting population growth into Limerick City and to the success of the Gateway overall.	Impacts arising from interactions are avoided by integration of mitigation measures into the LRFIP
Retail Strategy for the Mid West Region 2010 - 2016	Yes	Yes	Yes	Promotes further development at Roxboro Shopping Centre and Watch House Cross and identifies these as a District Centre	Impacts arising from interactions are avoided by integration of mitigation measures into the LRFIP
Limerick and Clare Sports and Recreational Strategy 2012	Yes (partial)	Yes	Yes	The strategy is sub regional and high level in its approach, and does not, therefore, focus on community based or community level facilities though it does recognise their importance	None
Regional					
Limerick City Development Plan 2010 - 2016	Yes	Yes	Yes	Contains very specific policies and objectives for the regeneration areas which have been incorporated into the LRFIP	Impacts arising from interactions are avoided by integration of mitigation measures into the LRFIP
Limerick 202 – An Economic and Spatial Plan for Limerick	Yes	Yes	Yes (partial)	Supports a range of economic initiatives for the regeneration area. Could lead to population growth in the city and greater demand for housing which could impact on regeneration area.	Impacts arising from interactions are avoided by integration of mitigation measures into the LRFIP
Limerick City Centre Strategy 2008	Yes	No	No	May be indirect effects on population growth and demand arising from increased attractiveness of the city as a place to live and do business	Impacts arising from interactions are avoided by integration of mitigation measures into the LRFIP

Table 8.4 Knowledge of likely effects of other plans with potential to interact with IP effects (Conintued)

9. Mitigation Measures

9.1 INTRODUCTION

Mitigation measures are measures envisaged to prevent, reduce and, as fully as possible, offset any significant adverse impacts on the environment of implementing the LRFIP. Mitigation involves ameliorating significant negative effects. Where there are significant negative effects, consideration is given in the first instance to preventing such effects or, where this is not possible for stated reasons, to lessening or offsetting those effects.

Mitigation measures can be roughly divided into those that: avoid effects; reduce the magnitude or extent, probability and/or severity of effects; repair effects after they have occurred, and; compensate for effects, balancing out negative impacts with other positive ones. There are two types of mitigation measures.

The first involves high-level preventative mitigation measures that were incorporated into the drafting of the LRFIP document, including the preparation of strategic environmental constraints mapping and consideration of the broadest possible range of alternatives in regeneration approaches particularly in relation to the housing strategy. The second type of mitigation measures involves those that address the implementation of the LRFIP. A number of these mitigation measures have already been fully integrated into the LRFIP. It is noted that there are linkages between various mitigation measures and that the mitigation of certain effects will be contributed towards by multiple measures.

Additional, more detailed mitigation measures to those identified would be likely to be required by lower tier, project specific, environmental assessments and would need to be integrated into relevant specific projects.

Ultimately it is proposed that the LRFIP will be adopted as a document as part of the development plan review process and thus will be implemented under the provisions of that Development Plan. There are already extensive policies and objectives within the development plan that seek to minimise potential environmental impacts arising from certain projects and actions and once the LRFIP is integrated into the development plan these policies will also act as mitigatory measures for projects within the LRFIP. Thus in order to avoid duplication of policies and objectives it is proposed to highlight existing policies and objectives within the Limerick City Development Plan 2010 – 2016 that will directly influence and mitigate proposals within the LRFIP.

Mitigation measures are not necessary for all of the nine environmental variables (EPOs) identified. Rather mitigation measures are only proposed when considered necessary to mitigate against potential effects and where the assessment has demonstrated that potential negative or unknown impacts could arise.

9.2 BIODIVERSITY FLORA AND FAUNA

Proposals contained within the LRFIP to increase connectivity within and throughout the regeneration area could have potential significant impacts in terms of disturbance, fragmentation or loss of habitats. The provision of a new connection across the River Shannon at St. Mary's Park, and the upgrade of Thomond Weir are two of the more significant proposals given their location in a SAC. However potential impacts could also arise from smaller projects, including pedestrian and cyclist access to areas of natural recreation. Such impacts could include disturbance, fragmentation or loss of habitats.

Existing policies in the Limerick City Development Plan along with existing and proposed measures and actions in the LRFIP will ensure that habitats, designated and undesignated, are protected and enhanced and that any potential impacts will not arise.

9.2.1 Existing Development Plan Mitigation Policies

LBR.8 It is the policy of Limerick City Council to apply the precautionary principle in relation to proposed development in environmentally sensitive areas to ensure all potential adverse impacts on any designated natural heritage area and any NATURA 2000 sites arising from any proposed development or land use activity are avoided, remedied or mitigated.

LBR.9 It is the policy of Limerick City Council to ensure that proposals along the River Shannon and other waterways associated with the River Shannon catchment within Limerick City will achieve an appropriate balance of uses commensurate with the sensitivity of the natural environment and avoiding adverse impacts on European conservation sites and sensitive natural receptors associated with the River Shannon.

LBR10 It is the policy of Limerick City Council:

- To protect and maintain existing important individual and groups of trees from development risk, provide additional tree planting of native deciduous trees and other appropriate plantings through planning permissions in order to
- benefit local biodiversity;
- To strengthen the protection of trees in the City and protect tree lined settings;
- To preserve, maintain and increase the general tree cover in the City by extending planting at identified locations LBR16

It is the policy of Limerick City Council to develop a network of high quality amenity walkway routes, particularly along waterways, linking existing parks and public open spaces and providing for strategic creation of new public open spaces.

9.2.2 Proposed Additional Mitigation Measures within the LRFIP

1. The route of the proposed connection from St. Mary's Park over the River Shannon shall be selected to ensure no significant impacts on the integrity of the SAC site. Restricted working areas will be imposed to ensure minimal disturbance to sensitive habitats. (S.2.6.1)
2. Ensure that any development proposed does not have a negative impact on habitats (S.4.1.15) (S.2.6.4).

9.3 WATER

The existing water supply in St. Mary's Park requires upgrading and there are mitigation measures

included in the LRFIP to upgrade the existing network as houses are being refurbished, demolished and reconstructed. Perhaps the single biggest issue in relation to water is the issue of flooding in St. Mary's Park, notwithstanding that no new greenfield sites are proposed within the flood zone area. From the outset the LRFIP has taken a precautionary approach to development within St. Mary's Park such that replacement housing only (on sites already occupied by housing but demolished under a previous regeneration programme) is to be facilitated on vacant sites arising from the demolition of existing housing.

The application of a Justification Test in accordance with the Flood Risk Management Guidelines for Planning Authorities, was applied to works in St. Mary's Park to demonstrate 'exceptional circumstances'. The Justification Test in support of the provision of infill residential development in St. Mary's Park has been deemed to justify the proposed development. Nonetheless adopting a precautionary approach is promoted such that development within Flood Zone C should occur in the first instance and no development should occur in Flood Zone B or A until such a time as the CFRAMS have been published and the potential impacts of development in these zones are reassessed.

Existing policies in the Limerick City Development Plan along with existing and proposed measures and actions in the LRFIP will ensure that waters within the regeneration area are protected and enhanced and that any potential impacts will not arise.

9.3.1 Existing Development Plan Mitigation Policies

EM.2 It is the policy of Limerick City Council to assist in the preparation and joint implementation of the Shannon River Basin Management Strategy in order to promote and achieve an improvement of both surface and ground water quality.

WS.7 It is the policy of Limerick City Council to ensure that all new developments incorporate sustainable urban drainage systems at the application stage.

WS.8 It is the policy of Limerick City Council to continue to work towards reducing flooding within the City and ensure that all new development proposals comply fully with the requirements of 'The Planning System & Flood Risk Management Guidelines for Planning Authorities', 2009, and any additional guidance introduced during the lifetime of the Development Plan.

WS.9 It is the policy of Limerick City Council to ensure that development should not itself be subject to an inappropriate risk of flooding nor should it cause or exacerbate such a risk at other locations.

9.3.2 Proposed Additional Mitigation Measures within the LRFIP

1. Management of the existing and future flood risk shall occur by protecting the integrity of the existing flood defences and embankments, by incorporating flood resistant and flood resilient measures, by utilising SUDS and by establishing flood warning and emergency procedures (S.2.6.4.13) and (S.4.1.15)
2. Any new housing will need to robustly satisfy the sequential approach and justification test as outlined in the Flood Risk Management Guidelines 2009 for proposed replacement housing in St. Mary's Park (S.4.2.12)
3. A precautionary approach is promoted such that development within Flood Zone C should occur in the first instance and no development should occur in Flood Zone B or A until such a time as the CFRAMS have been published and the potential impacts of development in these zones are reassessed.
4. Ensure that any development proposed does not have a negative impact on the water quality (S.4.1.15)

9.4 POPULATION & HEALTH

The overall objective of the LRFIP is to increase quality of life for its residents and it is considered that the measures set out in the LRFIP seek to achieve this objective quite effectively. However there is one area of uncertainty where potential impacts may not be fully understood and that is the social impacts arising from the temporary and permanent relocation and displacement of people out of their community and the breakdown of community structures on foot of demolition. The difficulty in determining such impacts is that there is no information immediately available and thus impacts can not be qualified.

Existing measures and actions in the LRFIP will ensure that the quality of life of the residents within the regeneration areas are protected and enhanced.

9.4.1 Proposed Additional Mitigation Measures within the LRFIP

1. An extensive evaluation approach including programme and thematic evaluation of the LRFIP will occur over the years of implementation which can inform and redirect the Housing Strategy if necessary (section 1.3 Implementation and Delivery).

9.5 CULTURAL HERITAGE

Although there are no, as yet, identified sites of cultural heritage within the regeneration areas proposed for phased development there is always the possibility of sub-terrain archaeological remains, particularly within St. Mary's park which is partially located within the Zone of Archaeological Potential.

Existing policies in the Limerick City Development Plan along with existing and proposed measures and actions in the LRFIP will ensure the ongoing protection of cultural heritage.

9.5.1 Existing Development Plan Mitigation Policies

ACT.13 It is the policy of Limerick City Council to protect heritage buildings through the proper planning and sustainable development of City of Limerick.

BHA.2 It is the policy of Limerick City Council to protect and enhance the archaeological value of the sites (and their settings) located within the 'Zone of Archaeology Potential' and all other features listed in the Sites and Monuments Record (SMR).

BHA.3 It is the policy of Limerick City Council to require Archaeological Impact Assessment be carried out on all development proposals that are likely to

9. Mitigation Measures

impact upon in-situ archaeological structures or deposits within the Zone of Archaeology Potential. BHA.12 It is the policy of Limerick City Council to protect all structures indicated on the Record of Protected Structure which shall include structures or parts of structures which are of special social architectural, historical, archaeological, artistic, cultural, scientific social or technical interest and continually review the Record where necessary.

9.5.2 Proposed Additional Mitigation Measures within the LRFIP

1. Consultation with the Department of Arts, Heritage & the Gaeltacht (DAHG) at project level and, if required, an on-site archaeologist will monitor excavation works at project level stage (S.4.1.17).
2. Advocates practices in accordance with the good practice guide commissioned by Limerick City Council entitled 'Development and Archaeological Study of King's Island and Limerick (S.4.2.12).

9.6 AIR AND CLIMATIC FACTORS

Proposals within the LRFIP generally have an insignificant impact or no relationship with this environmental receptor. However the extensive demolition programme proposed could potentially give rise to significant dust emissions if not property controlled which could temporarily affect air and climatic factors.

Existing policies in the Limerick City Development Plan along with existing and proposed measures and actions in the LRFIP will ensure that adverse impacts on air and climatic factors will not arise.

9.6.1 Existing Development Plan Mitigation Policies

EM.22 It is the policy of Limerick City Council to continue monitoring air quality and air quality trends and to expand the effectiveness and extent of monitoring arrangements in accordance with EU policy directives on air quality and to promote and develop the use of environmentally friendly fuels (such as bio fuels) in City Council vehicles and machinery.

EM.17 It is the policy of Limerick City Council to encourage energy efficiency through the design of buildings, layout and orientation on site.

9.6.2 Proposed Additional Mitigation Measures within the LRFIP

1. Dust minimisation plans shall be incorporated into construction and demolition projects at development stage.
2. All suitable materials/soils that are stripped/excavated for construction purposes shall be re-used to the greatest possible degree as fill material where appropriately needed within developments, landscaping in the regeneration areas

9.7 NOISE

The LRFIP seeks to promote pedestrian and cycle linkages throughout the regeneration area and therefore generally has a positive impact on traffic and transport through seeking a reduction in traffic and associated noise levels. However there are a number of new road proposals required to provide essential linkages between the regeneration areas and the wider city. There may be potential negative impacts arising from the operation of these roads relating to noise and increased traffic flows on feeder roads.

Existing policies in the Limerick City Development Plan will ensure that adverse impacts shall not occur on the acoustical quality of the area.

9.7.1 Existing Development Plan Mitigation Policies

EM.23 It is the policy of Limerick City Council to require all major developments to be d esigned and operated in a manner that will avoid significant noise impacts to sensitive receptors.

9.8 MATERIAL ASSETS - WASTE MANAGEMENT

The LRFIP proposes a range of measures that generally has no relationship with waste management and therefore the overall impacts of the LRFIP must be considered to be neutral. However, the proposed demolition programme could have the potential to significantly impact on waste management policies for the region having regard to the extensive demolition waste that will be generated.

However, existing policies in the Limerick City Development Plan along with existing and proposed

measures and actions in the LRFIP will ensure that the LRFIP will not adversely impact on waste management policies in the region.

9.8.1 Existing Development Plan Mitigation Policies

EM.9 It is the policy of Limerick City Council to reduce the generation of Construction & Demolition Waste and ensure that reuse and recycling of this waste is maximized in support of the implementation Plan for the Management of C&D in the Region.

EM.10 It is the policy of Limerick City Council to require Applicant/Developer at the planning stage to address the issue of waste management for both the construction phase of the development and the operational phases.

9.8.2 Proposed Additional Mitigation Measures within the LRFIP

1. A demolition waste management plan shall be required to facilitate recycling of demolition waste within the regeneration area.
2. All new and where possible refurbished houses shall be provided with facilities for the storage and segregation of waste pending removal.

9.9 CONCLUSION

In conclusion it is apparent from the above assessment that the LRFIP and the Limerick City Development Plan into which the LRFIP will be adopted, includes mitigation measures in the form of statement, targets and measures to offset any potential impacts on the environmental receptors. An approach to development and masterplanning with sustainability at its core facilitates automatic mitigation measures to offset any potential adverse impacts on the environment. Statements within the LRFIP, along with adopted policy in the Limerick City Development Plan, serve to formalise the mitigation measures and fully integrates them into the development management process.

10. Monitoring Measures

10.1 INTRODUCTION

The SEA Directive requires that the significant environmental effects of the implementation of plans and programmes are monitored. This Environmental Report puts forward proposals for monitoring the likely significant effects of implementing the LRFIP. Monitoring enables, at an early stage, the identification of unforeseen adverse effects and the undertaking of appropriate remedial action. In addition to this, monitoring can also play an important role in assessing whether the LRFIP is achieving environmental objectives and targets, whether these need to be reexamined and whether the proposed mitigation measures are being implemented.

10.2 INDICATORS AND TARGETS

Monitoring is based on the indicators which were chosen earlier in the process. These indicators allow quantitative measures of trends and progress over time, relating to the Environmental Protection Objectives, to be used in the evaluation. Focus is given to indicators which are relevant to the likely significant environmental effects of implementing the LRFIP. Existing monitoring arrangements will be used in order to monitor the selected indicators. Each indicator to be monitored is accompanied by the target(s) which were identified for the relevant legislation (see Section 5).

Table 10.1 below shows the indicators and targets which have been selected for monitoring the likely significant environmental effects of implementing the LRFIP. The Monitoring Programme may be updated to deal with specific environmental issues – including unforeseen effects – as they arise.

10.3 SOURCES

Existing monitoring sources exist for each of the indicators and include those maintained by the relevant authorities. Where significant adverse environmental effects, including positive, negative, cumulative and indirect, are likely to occur as a result of implementing other relevant plans and programmes such instances should be identified and recorded and should feed into the monitoring evaluation. Consultations with the relevant authorities will also enable data to be sourced for certain indicators.

10.4 IMPLEMENTATION AND REPORTING

The Office of Regeneration, Limerick City Council is responsible for the implementation of the monitoring programme set out in this section. This includes collating existing relevant monitored data, the preparation of preliminary and final monitoring evaluation reports, the publication of these reports

Table 10.1 Monitoring Measures

	Environmental Protection Objectives	Selected Indicator(s)	Selected Target(s)	Source	Monitoring Frequency
Biodiversity Flora & Fauna	B1 To ensure compliance with the Habitats Directive with regard to the protection of Natura 2000 Sites and Annexed habitats and species	Conservation status of habitats and species as reported upon under Article 17 of the Habitats Directive	Maintenance of favourable conservation status for all habitats and species protected under national and international legislation to be unaffected by implementation of the LRFIP	a) DAHG report on the implementation of the measures contained in the Habitats Directive - as required by Article 17 of the Directive;	a) Every 6 years b) Annually, to inform Environmental Appraisal Report which will accompany annual TDPs
	B2 To effectively manage other environmental features and maintain wildlife corridors which are of major importance for wild fauna and flora and essential for the migration and dispersal of wild species	Percentage loss of functional connectivity without remediation resulting from development provided for by the LRFIP	No significant ecological networks or parts thereof which provide functional connectivity to be lost without remediation resulting from development provided for by the LRFIP	b) Consultations with the NPWS Consultations with the NPWS	Annually
	B3 To avoid significant impacts on relevant habitats, species, environmental features or other sustaining resources in Wildlife Sites.	Number of significant impacts on relevant habitats, species, environmental features or other sustaining resources in Wildlife Sites resulting from development provided for by the LRFIP	Avoid significant impacts on relevant habitats, species, environmental features or other sustaining resources in Wildlife Sites resulting from development provided for by the LRFIP	Consultations with the NPWS	Annually

	Environmental Protection Objectives	Selected Indicator(s)	Selected Target(s)	Source	Monitoring Frequency
Water	W1 To prevent impacts upon the status of any waters in line with the recommendations outlined in the Shannon River Basin Management Plan.	Classification of overall status under the European Communities Environmental Objectives (Surface Waters) Regulations 2009 and the classification of quality standards and thresholds under the Groundwater Directive 2006/118/EC	Not to cause deterioration in the status of any water or affect the ability of any water to achieve 'good status' by 2015.	a) Data issued under the Water Framework Directive Monitoring Programme for Ireland (EPA, 2006) b) Data gathered by Limerick City and County Councils under the Shannon River Basin Management Plan project	a) Unknown b) Unknown
	W2 To ensure an adequate supply of potable drinking water	Classification of overall standard under the European Communities (Drinking Water) (No. 2) Regulations 2007	Not to cause deterioration in the quality of drinking water and to increase quality of provision and supply where required.	a)Monitoring results from Limerick City Council Laboratory Staff b) HSE Monitoring Data	a) Weekly b) Monthly
	W3 To reduce and manage the risk of flooding	Extent of development permitted within areas identified as being located within Flood Zone A or B.	Not to provide for additional and surplus housing and commercial development in areas vulnerable to flooding (Zones A & B)	a) Planning Department Limerick County Council planning lists for granted permissions	a) Weekly
Population & Health	PH1 To protect and enhance people's quality of life based on high quality residential, community, working and recreational environments and on sustainable travel patterns.	Comparison of Census of Population and Small Area Population Statistics 2011 with new Census data to be gathered in 2016 with particular reference to population, house type, household by type, house ownership and means of travel.	To increase existing residential densities within the regeneration area. To diversity existing housing mix To increase the number of private dwellings. To grow population in line with the core strategy as set out in the City Development Plan To increase the use of public transport, walking and cycling	a) Planning Department Limerick County Council Annual Planning Statistics b)Planning Department Development Plan Review c) Census of Population	a) Annually b) Every four years c) Every five years
Cultural Heritage	CH1 To avoid unauthorised impacts upon archaeological heritage (including entries to the RMP) and architectural heritage (including entries to the RPSs)	Number of unauthorised developments occurring which result in full or partial loss to entries to the RMP and RPS and the context of the above within the surrounding landscape where relevant, resulting from development provided for by the LRFIP	No unauthorised developments occurring which result in full or partial loss to entries to the RMP and RPS and the context of the above within the surrounding landscape where relevant, resulting from development provided for by the LRFIP	a) Consultations with the DAHG; b) Consultations with Limerick City Council re Record of Protected Structures List	a) Yearly b) Yearly
Soils & Geology	S1 To minimise effects upon the sustainable use of land, mineral resources or soils	The number of houses being demolished versus the number of houses undergoing refurbishment. The area of brownfield land under development and the area of development on previously undeveloped greenfield sites.	To maximise the opportunities associated with refurbishment of houses and to minimise the number of demolitions. To focus development on brownfield sites and to minimise the extent of development on greenfield land.	a)Internal data records from Office of Regeneration b)Planning Department Development Plan Review	a) Yearly b) Every four years

Table 10.1 Monitoring Measures *(Continued)*

	Environmental Protection Objectives	Selected Indicator(s)	Selected Target(s)	Source	Monitoring Frequency
Air & Climatic Factors	AC1 To assist and facilitate the achievement of higher level targets contained in the targets relating to the Kyoto Protocol	Number of houses renovated and retrofitted to BER C rating. Comparison of Census of Population and Small Area Population Statistics 2011 with new Census data to be gathered in 2016 with particular reference to means of travel.	All housing within the regeneration areas have as a minimum a BER C rating. Provide cycleways and increase number of pedestrian links within and throughout the regeneration areas	a)Internal data records from Office of Regeneration b) Census of Population c) Data from Limerick City Council - the Smarter Travel Demonstration City	a) Yearly b) Every five years c) Unknown
Noise	N1 To maintain and, where possible, improve acoustical quality for the current and future residents of the regeneration area.	Noise limits as set out in the World Health Organisation (WHO) Guidelines for Community Noise (1999) and the NRA Guidelines for the Treatment of Noise and Vibration in National Road Schemes	All residential development to have a high quality internal environment in accordance with acceptable noise levels	a) Internal data records from Office of Regeneration b) Data from EPA gathered for preparation of Noise Action Plan in relation to traffic noise on key route	a) Yearly b) Unknown
Landscape & Amenity	LA1 To conserve and enhance valued natural landscapes and features within them including those of geological value.	Number of complaints received from statutory consultees regarding avoidable impacts on the landscape resulting from development provided for by the LRFIP	No avoidable impacts on the landscape resulting from development provided for by the LRFIP	a) Complaints from statutory consultees	a) Yearly
Material Assets	MA1 To reduce traffic levels by encouraging modal change from car to more sustainable modes of transport such as public transport, walking & cycling	Comparison of Census of Population and Small Area Population Statistics 2011 with new Census data to be gathered in 2016 with particular reference to means of travel.	Provide cycleways and increase number of pedestrian links within and throughout the regeneration areas	a) Census of Population b) Data from Limerick City Council gathered under the Ireland's Smarter Travel Demonstration City 2012 – 2016	a) Every five years b) Unknown
	MA2To reduce the generation of waste and adopt a sustainable approach to waste management	Number of houses provided with or retrofitted with facilities for the storage and segregation of waste pending removal. Quantity of demolition material generated from regeneration areas that can be recycled and reused in regeneration building programme.	All houses to be provided with facilities for the storage and segregation of waste pending removal. Prepare and implement a waste recycling plan for the regeneration area.	a) Limerick City Council Environment Department Waste Permit Detail b) EPA Monitoring of Waste Licence	a) Unknown b)Annually

Table 10.1 Monitoring Measures *(Continued)*

11. Overall Findings

and, if necessary, the carrying out of corrective action. This monitoring will be undertaken as part of the overall monitoring and evaluation approach set out in Volume 3 of the LRFIP.

11.1 General Approach

This LRFIP is a practical and strategic framework plan detailing how the regeneration programme for four statutorily defined areas surrounding Limerick city is intended to be implemented. It identifies the issues, objectives and associated programmes and actions that will need to be implemented to facilitate regeneration and deliver real change on the ground. The LRFIP also establishes the parameters and criteria for the processes by which subsequent decisions affecting regeneration will be made. It adopts a holistic and inclusive approach integrating social, economic and environmental issues within its physical proposals.

The chosen development philosophy as set out in the LRFIP and summarised in Chapter 2.0, has been assessed in terms of its overall sustainability and its potential to impact on the environment.
The broad physical measures proposed in the LRFIP were assessed against environmental protection objectives established under this SEA process and the results indicate that implementation of the LRFIP will not result in a significant negative or adverse impact on the environmental resources within the regeneration area or the wider catchment of Limerick city. It has been demonstrated through detailed assessment (Appendix 1) that the measures and proposals are consistent with this summary and that in general the LRFIP will have a neutral to positive impact on the environment as a whole.

Where there is the potential for negative impacts or and uncertain impact has been identified, mitigation as well as enhancement measures have been identified. The implementation of these measures, coupled with the monitoring procedures will ensure the LRFIP has sustainability at its core.

At the outset of the assessment process, a number of environmental issues were identified, principally biodiversity, flora and fauna; and water issues particularly relating to flooding. While these are and remain the key environmental challenges facing the Office of Regeneration over the lifetime of the LRFIP they also have complex interrelationships with other environmental receptors. Therefore it is imperative that a holistic, all inclusive response towards the protection of the natural assets within the regeneration areas is adopted. The potential synergies at play if appropriately addressed will lead to an improvement in the quality of life for the residents of the regeneration area.

11.2 Environmental Issues

The two primary environmental issues identified (biodiversity, flora and fauna; and water issues particularly relating to flooding) are interrelated and cumulatively assessed. From the outset the LRFIP has taken a precautionary approach to development within environmentally designated sites and within identified flood zone areas. The overall approach of the LRFIP is to concentrate new development on infill or under-utilised sites within an existing built-up, urban area whilst avoiding more environmentally sensitive and vulnerable sites. This approach is particularly relevant to St. Mary's Park which is deemed to be the most sensitive of the four regeneration areas from a biodiversity, flora and fauna perspective having regard to the SAC designation which surrounds the island.

Much of St. Mary's Park is also located within flood zone A, along with parts of Moyross and a small area of land located on the northern side of a tributary of the Ballinacurra Creek in Southill. Only refurbishment works and replacement new build housing on vacant gap sites arising from the demolition of existing housing will be permitted in flood zone areas. No additional new build housing is proposed. A detailed justification test was undertaken to support this strategy and approach and demonstrates 'exceptional circumstances' in the case of St. Mary's Park.

The approach as set out in the LRFIP associated with existing policies in the Limerick City Development Plan and other stated measures relating to flooding in the LRFIP ensures that the primary environmental issues identified in the LRFIP accord with the principles of sustainable planning and development and that no adverse impacts will arise in relation to the environment.

11.3 Conclusion

It is acknowledged that a planned and holistic approach to the orderly regeneration of the areas is required. Development is both necessary and desirable to achieve regeneration and economic growth within the areas and the purpose of the Strategic Environmental Assessment is to ensure that the guiding principals for development do not impact in an adverse manner on the environmental quality of the plan area. The assessment process which has been carried out in conjunction with the preparation of the LRFIP, allowed for an early indication of the potential environmental effects and this resulted in changes and alterations throughout the course of preparation.

In summary, the development measures put forward in the LRFIP were found to be acceptable in terms of protecting the environmental quality within the regeneration areas. Monitoring of the plan throughout its lifetime will ensure that any potential adverse environmental impacts, unforeseen at this stage will be identified early, so as to prevent any deterioration of the environment. The LRFIP, as currently presented, balances regeneration and economic growth with environmental protection and conservation and encompasses fully the ethos of sustainability.

Appendix 1:

Evaluation of LRFIP Measures against Environmental Protection Objectives

Appendix 1: Evaluation of LRFIP Measures against Environmental Protection Objectives

Table 1.0 Environmental Protection Objectives

	LRFIP Provisions	B1	B2	B3	W1	W2	W3	PH1	CH1	S1	AC1	N1	LA1	MA1	MA2	Potential Impacts	Comments
St Mary's																	
Movement & Connectivity Strategy	Examine options to improve permeability and c onnections within St. Mary's Park	o	o	o	o	o	?	+	?	o	+	?	o	+	O	The proposed internal linkages largely occur on brownfield or existing urbanised sites. However most of St. Mary's Park is located within Flood Zone A and is subject to flooding. Thus the exact design and location of these routes will be important in the consideration of flood risk management. Whilst internal linkages are proposed on land outside the SAC the potential impact on other environmental features would need to be investigated fully. Whilst such connections would directly benefit the population providing greater connectivity they could also lead to increased mobility and if not properly managed an increase in the use of the car. The southernmost part of the regeneration area is located within a Zone of Archaeological Potential so further investigation would be required to address the uncertain impact on cultural heritage.	Adherence to the Guidelines for Planning Authorities 'The Planning System and Flood Risk Management' and Best Practice Urban Design principles. Provision of works within St. Mary's Park must be subject to a detailed Flood Risk Assessment. Project level NIS shall be required. Archaeological Impact Assessment required.
	Upgrade Thomond Weir for pedestrian use	?	o	?	?	o	?	+	o	o	+	o	o	+	o	There are many uncertain impacts on EPOs as the extent of upgrade works is not known at this stage. However as the proposed works involve refurbishment it is likely that any potential impacts could be mitigated. Altough new works are not proposed within the SAC such development would result in greater pedestrian traffic through the SAC.	Consideration would need to be given to the protection of water quality during construction and any works. Guiding barriers would need to be constructed to control the movement and direction of flow of pedestrian traffic. Project level NIS shall be required.
	Provide options for a new connection across the River Shannon to New Road	?	?	?	?	o	?	+	o	o	o	?	?	?	o	Potential negative impacts however appropriate mitigation could negate these. The design and precise location of the connection will be critical to determining whether significant impacts occur to the Lower River Shannon SAC. The preservation of alluvial woodland will be of paramount importance. The proposed linkage is an important piece of infrastructure for the regeneration and permeability for the area. Construction would greatly aid circulation patterns alleviating social isolation within the northern most extremity of the island. Cycle lanes and pathways are proposed as part of this route adding to the infrastructure for sustainable modes of travel. There are a Number of positive impacts associated with this development. However, conflicts do occur with the EPOs but are likely to be mitigated. In this instance many of the potential impacts and mitigation are more suitable for assessment at design & project level stage as uncertainties are still prevalent at this stage.	Adherence to a number of policy documents and guidelines including: 'Smarter Travel, 2009 – 2020', 'Traffic & Transport Assessment Guidelines, 2007' the DTO's 'Traffic Management Guidelines', the Noise Regulations, 2004 and Limerick City Council's 'Draft Noise Action Plan'. Project level NIS shall be required.

	LRFIP Provisions	B1	B2	B3	W1	W2	W3	PH1	CH1	S1	AC1	N1	LA1	MA1	MA2	Potential Impacts	Comments
St Mary's																	
Landuse Strategy	Promote employment growth through re-use of underutilised sites and buildings	o	o	o	o	o	?	+	?	o	+	o	+	?	o	There are many positive impacts arising from this initiative but there are also some uncertain impacts which can only be determined at detailed project stage. It is likely however that any potential impacts could be mitigated particularly relating to noise and potential traffic generation. Promotion of brownfield sites and underutilised sites is very positive. The southernmost part of the regeneration area is located within a Zone of Archaeological Potential so further investigation would be required to address the uncertain impact on cultural heritage.	Adherence to the Guidelines for Planning Authorities 'The Planning System and Flood Risk Management'. Provision of works within St. Mary's Park must be subject to a detailed Flood Risk Assessment. Archaeological Impact Assessment required.
	Support provision for an extended St. Mary's Park Community Centre	o	o	o	o	o	?	+	?	+	o	o	+	o	o	Extending the existing community centre would bring many positive impacts but its location within an identified flood zone A could result in increased flood risk unless appropriately mitigated. Relocation out of the identified flood zone would be a preference but regard must be had to its existing use and function. Although not located within a Zone of Archaeological Potential given the historical nature of the area there could be potential for sub terrain archaeology and this would need to be investigated further.	Adherence to the Guidelines for Planning Authorities 'The Planning System and Flood Risk Management'. Provision of works within St. Mary's Park must be subject to a detailed Flood Risk Assessment. Adherence and conformity to development management standards as set out in the Limerick City Development Plan 2010 – 2016 particularly relating to archaeological policies. Project level NIS shall be required.
	Upgrade the existing water network in tandem with refurbishment works	o	o	o	o	+	o	+	o	o	o	o	o	o	o	Such upgrade provision would have positive impacts in ensuring an adequate supply of water to the area and would result in a reduction in overall water leakage.	

	LRFIP Provisions	B1	B2	B3	W1	W2	W3	PH1	CH1	S1	AC1	N1	LA1	MA1	MA2	Potential Impact	Comments
St Mary's																	
Housing Strategy	Refurbish 321 existing houses	o	o	o	o	o	o	+	+	+	o	o	+	o	+	Mainly positive to neutral long term impacts associated with refurbishment. The standards of existing residential dwellings will be improved in relation to energy efficiency. The current landscape of the urban area is run down and neglected. The physical improvement of existing dwellings will have a visually positive impact on the existing urban landscape. Short-term negative impacts may be felt by the population during the refurbishment phase but these will be temporary in nature.	
	Demolish 65 houses and replace with 49 new homes	?	o	o	o	o	o*	+/-	o	+	o	o	+	o	-	Mainly positive to neutral long term impacts associated with demolition & rebuild with some unknowns. There is an uncertain impact on adjoining wetlands due to the potential for hydrological changes to occur within areas that are currently wetland. It is important that water is not drained from the wetland as a result of this phase. There are both positive and negative impacts for the community. Obviously the positives arise from a much higher standard of residential development that increases quality of lie. However there could also be impacts arising from the displacement of people out of their community and the breakdown of community structures. This uncertain impact needs to be evaluated further and monitored. There are positive impacts for soils and geology as all replacement housing is to occur on infill sites. The current landscape of the urban area is run down and neglected. The physical improvement of existing dwellings will have a visually positive impact on the existing urban landscape. Short-term negative impacts may be felt by the population during the demolition & construction phase however these will be temporary in nature.	The LRFIP should state that this proposal has been subject to rigorous testing in accordance with the Guidelines for Planning Authorities 'The Planning System and Flood Risk Management'. It has been subject to a detailed Flood Risk Assessment and Justification Test. A sequential approach to new build should be adopted such that any replacement housing should occur outside the identified flood area in the first instance and prior to considering development in Flood Zone B & A regard must be had to the most up to date flood data and the proposals shall be reassessed. Minimum finished floor levels should be placed at or above 5.35 m and this should be incorporated into the text of the LRFIP. Project level NIS shall be required. Monitoring of the social impacts associated with the housing programme should be initiated for future reference. A demolition waste management plan shall be required to facilitate recycling of demolition waste

* The strategy of demolition and rebuild was subject to a detailed FRA by Punch Consulting

	LRFIP Provisions	B1	B2	B3	W1	W2	W3	PH1	CH1	S1	AC1	N1	LA1	MA1	MA2	Potential Impacts	Comments
St Mary's																	
Open Space & Public Realm Strategy	Return eastern side of St. Munchin's Street to parkland	?	+	?	o	o	o	+	o	o	+	o	+	o	-	Largely positive to neutral impacts with some uncertain impacts. Returning the land to parkland involves demolition of houses and this could give rise to indirect impacts on the SAC if the water regime in the wetland was to be affected. The demolition of houses in this instance is seen as a positive as all displaced families are to be rehoused through replacement infill housing.	
	Retain and upgrade existing sports facilities at football club, the boat club and handball alley.	o	+	+	o	o	o	+	o	o	o	o	+	o	o	Largely positive to neutral impacts. A positive contribution to the area.	
	Manage the existing and future flood risk	?	+	+	+	o	+	+	+	+	o	o	+	o	o	Largely positive to neutral impacts. Such management could have potential impacts on the SAC depending on the initiatives proposed but these could be effectively mitigated.	

	LRFIP Provisions	B1	B2	B3	W1	W2	W3	PH1	CH1	S1	AC1	N1	LA1	MA1	MA2	Potential Impact	Comments
Moyross																	
	Support the construction of the Coonagh to Knockalisheen bypass	o	o	o	o	o	o	+	o	o	o	o	o	o	o	This road was the subject of an EIS and application to An Bord Pleanala which was granted permission. Any potential associated impacts have been appropriately mitigated.	This infrastructure is a critical element for the Regeneration of Moyross and Limerick City allowing for enhanced circulation patterns. This proposed new road is in accordance with National and local policy. This proposed route while aiding vehicular circulation will also facilitate public bus services, cycling and walking routes.
Movement & Connectivity Strategy	Create new streets to facilitate permeability and greater connections	o	o	?	o	o	o	+	o	o	+	?	-	+	O	The proposed internal linkages largely occur on brownfield or existing urbanised sites. However some of the connections are proposed on open space land and this has the potential to impact on linkages within the open space network. However a lot of the open space in Moyross is underutilised and so the internal provision of linkages and access routes could effectively enhance the existing open space provision in the area. Whilst such connections would directly benefit the population providing greater connectivity they could also lead to increased mobility and if not properly managed an increase in the use of the car.	

	LRFIP Provisions	B1	B2	B3	W1	W2	W3	PH1	CH1	S1	AC1	N1	LA1	MA1	MA2	Potential Impacts	Comments
Moyross																	
Land use Strategy	Expand Moyross Community Centre	o	o	o	o	o	o	+	o	+	o	o	+	o	o	Extending the existing community centre would bring many positive impacts.	
	Enhance Watchhouse Cross as a District Centre	o	o	o	o	o	?	+	o	o	o	o	o	+	o	Enhancing the existing centre would bring many positive impacts but its location within an identified flood zone A could result in increased flood risk unless appropriately mitigated.	
	Promote development of sites adjacent to the Moyross Enterprise Centre for enterprise development and redevelop the bays site as a natural training cluster	o	o	o	o	o	-	+	o	o	o	o	o	o	o	This proposal has both positive and negative impacts on different EPOs. It has positive benefits for the community. However the Enterprise Centre is partially located within Flood Zone A whilst the 'Bays' site is completely located within Flood Zone A. The sites also neighbour an adjoining SAC and pNHA.	Further development of sites adjacent to the Moyross Enterprise Centre should not be promoted in the LRFIP except on land located outside of the identified Flood Zone A. Redevelopment of the bays site as a training cluster should be subject to a detailed Flood Risk Assessment and should demonstrate compatibility of uses. Any development will be subject to project level NIA.

	LRFIP Provisions	B1	B2	B3	W1	W2	W3	PH1	CH1	S1	AC1	N1	LA1	MA1	MA2	Potential Impact	Comments
Moyross																	
Housing Strategy	Refurbish 451 existing housing units	o	o	o	o	o	o	+	+	+	o	o	+	o	+	Mainly positive to neutral long term impacts associated with refurbishment. The standards of existing residential dwellings will be improved in relation to energy efficiency. The current landscape of the urban area is run down and neglected. The physical improvement of existing dwellings will have a visually positive impact on the existing urban landscape. Short-term negative impacts may be felt by the population during the refurbishment phase but these will be temporary in nature.	
	Demolish 314 existing housing units and replace with 295 new homes	o	o	o	o	o	o	+/-	o	+/-	o	o	+	o	-	Mainly positive to neutral long term impacts associated with demolition & rebuild. There are both positive and negative impacts for the community. Obviously the positives arise from a much higher standard of residential development that increases quality of lie. However there could also be impacts arising from the displacement of people out of their community and the breakdown of community structures. This uncertain impact needs to be evaluated further and monitored. There are also positive and negative impacts on soils and geology as the provision of replacement housing will occur on both infill and greenfield sites. The current landscape of the urban area is run down and neglected. The physical improvement of existing dwellings will have a visually positive impact on the existing urban landscape. Short-term negative impacts may be felt by the population during the demolition & construction phase however these will be temporary in nature.	Monitoring of the social impacts associated with the demolition, replacement and new build housing programme should be initiated fir future reference. A demolition waste management plan shall be required to facilitate recycling of demolition waste. It is noted the LRFIP proposes a number of environmental management standards during construction.
	Provide additional homes through infill development	o	o	o	o	o	o	+	o	+	o	o	+	o	o	This approach to the provision of housing has both positive and neutral impacts.	
	Develop greenfield sites for housing	o	o	o	o	o	o	+	o	-	-	o	+	o	o	Development on greenfield land has the potential to alter soil formation and so must be considered to have a potentially negative impact. The LRFIP proposes to provide for new build housing on large expanses of existing open space which are underutilised, poorly located and badly managed. Thus development at such locations is considered to positively contribute to the landscape.	It is noted the LRFIP proposes a number of environmental management standards during construction.

	LRFIP Provisions	B1	B2	B3	W1	W2	W3	PH1	CH1	S1	AC1	N1	LA1	MA1	MA2	Potential Impacts	Comments
Moyross																	
Open Space & Public Realm Strategy	Protect and enhance landscape character of Delmege Estate	o	+	+	o	o	o	+	+	+	+	o	+	o	o	Largely positive to neutral impacts in the long term.	
	Provide a strategic linear park from the River Shannon through Moyross to Caherdavin	?	+	?	o	o	o	+	o	?	+	+	+	+	o	Largely long term positive impacts in relation to soil, landscape, cultural heritage, population, sustainable travel, air quality and climate with the creation of a large, park land area. However, there a number of unknown possible impacts, at this stage, as a result of landscaping and amenity development of the park areas. Amenity pressure can bring negative impacts to adjacent conservation areas through disturbance of wildlife. This can derive from humans and their pets as well as artificial lighting. The importation of alien invasive species (ponds are particularly susceptible to this), fertiliser run-off andwind-blown, or water-carried, herbicides or pesticides can also have negative impacts.	The likelihood and occurrence of significant impacts is dependant upon the eventual design and management of landscaping of the Park. It is therefore recommended that a suitably qualified person with ecological expertise be commissioned at an early stage to work with landscape architects to ensure that measures are taken to avoid negative effects to the environment.
	Restrict development of the landfill sites at Long Pavement Road	o	o	o	+	+	o	+	o	+	+	o	o	o	o	Largely positive to neutral impact in the long term.	Ongoing management of the site will be in conjunction with the EPA in accordance with the EPA Landfill Management Guidelines

	LRFIP Provisions	B1	B2	B3	W1	W2	W3	PH1	CH1	S1	AC1	N1	LA1	MA1	MA2	Potential Impact	Comments
Ballinacurra	**Weston**																
Movement & Connectivity Strategy	Provide significant alterations to existing transport network to facilitate connectivity within and throughout the area	o	o	o	o	o	o	+	o	o	o	?	o	+	O	Generally positive to neutral impacts. The proposed internal linkages largely occur on brownfield or existing urbanised sites. Whilst such connections would directly benefit the population providing greater connectivity thereby encouraging modal split including walking and cycling.	

	LRFIP Provisions	B1	B2	B3	W1	W2	W3	PH1	CH1	S1	AC1	N1	LA1	MA1	MA2	Potential Impacts	Comments
Ballinacurra	**Weston**																
Landuse Strategy	Promote enterprise development on existing underutilised sites	o	o	o	o	o	o	+	o	o	+	?	+	?	o	There are many positive impacts arising from this initiative but there are also some uncertain impacts which can only be determined at detailed project stage. It is likely however that any potential impacts could be mitigated particularly relating to noise and potential traffic generation. Promotion of brownfield sites and underutilised sites is very positive.	Adherence and conformity to development management standards as set out in the Limerick City Development Plan 2010 – 2016 particularly relating to noise thresholds and traffic management.
	Promote vitality and viability of local retail centre at Punches Cross	o	o	o	o	o	o	+	o	o	o	o	o	+	o	Positive to neutral impacts. Proposal is in accordance with the Mid West Retail Strategy.	The likelihood and occurrence of significant impacts is dependant upon the eventual design and management of landscaping of the Park. It is therefore recommended that a suitably qualified person with ecological expertise be commissioned at an early stage to work with landscape architects to ensure that measures are taken to avoid negative effects to the environment.
	Promote development of sites adjacent to community centre	o	o	o	o	o	o	+	o	+	o	o	+	+	o	Positive to neutral impacts. The clustering of activities close to existing community facilities would have a positive contribution towards a reduction in traffic levels.	

	LRFIP Provisions	B1	B2	B3	W1	W2	W3	PH1	CH1	S1	AC1	N1	LA1	MA1	MA2	Potential Impacts	Comments
Ballinacurra	**Weston**																
Housing Strategy	Refurbish 205 existing housing units	o	o	o	o	o	o	+	+	+	+	o	+	o	+	Mainly positive to neutral long term impacts associated with refurbishment. The standards of existing residential dwellings will be improved in relation to energy efficiency. The current landscape of the urban area is run down and neglected. The physical improvement of existing dwellings will have a visually positive impact on the existing urban landscape. Short-term negative impacts may be felt by the population during the refurbishment phase but these will be temporary in nature.	
	Demolish 27 existing housing units and replace with 40 new homes	o	o	o	o	o	o	+/-	o	+	o	o	+	o	-	Mainly positive to neutral long term impacts associated with demolition & rebuild. There are both positive and negative impacts for the community. Obviously the positives arise from a much higher standard of residential development that increases quality of lie. However there could also be impacts arising from the displacement of people out of their community and the breakdown of community structures. This uncertain impact needs to be evaluated further and monitored. There are positive impacts on the soils and geology variable as all replacement housing is to occur on infill sites. The current landscape of the urban area is run down and neglected. The physical improvement of existing dwellings will have a visually positive impact on the existing urban landscape. Short-term negative impacts may be felt by the population during the demolition & construction phase but these will be temporary.	Monitoring of the social impacts associated with the demolition, replacement and new build housing programme should be initiated for future reference. A demolition waste management plan shall be required to facilitate recycling of demolition waste. It is noted the LRFIP proposes a number of environmental management standards during construction.
	Provide additional homes on infill sites	o	o	o	o	o	o	+	o	+	o	o	+	o	o	This approach to the provision of housing has both positive and neutral impacts.	

	LRFIP Provisions	B1	B2	B3	W1	W2	W3	PH1	CH1	S1	AC1	N1	LA1	MA1	MA2	Potential Impact	Comments
Ballinacurra	**Weston**																
Open Space & Public Realm Strategy	Retain existing trees and enhance existing open spaces focusing on land around the community centre	o	+	+	o	o	o	+	o	+	+	o	+	o	o	Positive to neutral impacts.	

	LRFIP Provisions	B1	B2	B3	W1	W2	W3	PH1	CH1	S1	AC1	N1	LA1	MA1	MA2	Potential Impact	Comments
Southill																	
	Provide direct access from the M7 and N20 into Southill and from the Roxboro Roundabout into Southill	o	-	?	o	o	o	?	?	?	?	?	?	?	o	There are a number of uncertain impacts associated with this proposal which will require further study and clarification with regard to potential impacts on ecology, soils, air & climate, noise and landscape. There will be potential benefits to the population from a social and economic perspective providing greater access to Southill for employment and business opportunities. However such proposals may also lead to a substantial increase in traffic volumes on the Kilmallock Road which may adversely impact on the community living on that road. There may also be potential indirect impacts arising from noise and general disturbance and these need to be assessed further. However it is likely that such potential impacts could be mitigated.	The wording of the proposal providing direct access from the M7 and N20 into Southill should be amended to clarify that further study and investigation will be required before a suitable option can be promoted or supported in the LRFIP.
Movement & Connectivity Strategy	Transform the Roxborough Road and Rosbrien Road	o	o	o	o	o	o	+	o	o	+	+	+	+	o	Largely positive to neutral impacts. Both these roads accommodate heavy volumes of traffic with little regard to pedestrian and cycle uses. The proposed works would significantly contribute towards achieving modal change, would positively impact on the landscape, acoustical quality and air and climatic factors.	
	Explore potential for a link road from Bawnmore Road to Kilmallock Road	o	?	?	o	o	?	?	?	?	?	?	?	-	o	Largely unknown to neutral effects.	As clearly stated in the LRFIP this proposal requires further exploration prior to definite proposals coming forward.
	Improve internal local connections in particular those converging on the community hub	o	o	?	o	o	o	+	o	o	+	?	-	+	O	The proposed internal linkages largely occur on brownfield or existing urbanised sites. However some of the connections are proposed on open space land and this has the potential to impact on linkages within the open space network. However a lot of the open space in Moyross is underutilised and so the internal provision of linkages and access routes could effectively enhance the existing open space provision in the area. Whilst such connections would directly benefit the population providing greater connectivity they could also lead to increased mobility and if not properly managed an increase in the use of the car.	

	LRFIP Provisions	B1	B2	B3	W1	W2	W3	PH1	CH1	S1	AC1	N1	LA1	MA1	MA2	Potential Impacts	Comments
Southill																	
Landuse Strategy	Enhance Roxboro District Centre	o	o	o	o	o	o	+	o	o	o	o	o	+	o	Positive to neutral impacts. Proposal is in accordance with the Mid West Retail Strategy.	
	Expand the footprint of the Southill Area Centre for community uses	o	o	o	o	o	o	+	o	+	o	o	+	+	o	Positive to neutral impacts. The clustering of activities close to existing community facilities would have a positive contribution towards a reduction in traffic levels.	
	Upgrade Galvone Estate as a mixed use centre and further expand its employment generating uses	o	o	o	o	o	o	+	o	+	o	?	+	+	o	Positive to neutral impacts. The clustering of employment opportunities would provide for positive synergistic effects.	
	Promote an integrated educational campus	o	o	o	o	o	o	+	o	o	o	o	o	+	o	Positive to neutral impacts with significant positive impacts for the social integration of residents in the area.	It is recommended that the provision of an integrated educational campus is considered in the first instance on brownfield / underutilised sites or in vacant buildings.
	Relocate existing traveller halting sites	o	o	o	o	o	o	-	o	?	o	o	?	o	o	This objective has negative to neutral impacts. As no alternative location has been identified for the traveller community within the Southill area this objective could have a potential negative impact on the population having regard to displacement and existing community structures.	it is recommended that the wording of this objective is changed to “In consultation with the traveller community to consider an alternative location for traveller halting sites at Clonlong and Toppin’s field”
	Promote Barry’s Field as a large scale community garden	o	o	o	o	o	o	+	o	+	+	o	o	o	o	This proposal would have positive to neutral impacts on the environment.	

	LRFIP Provisions	B1	B2	B3	W1	W2	W3	PH1	CH1	S1	AC1	N1	LA1	MA1	MA2	Potential Impact	Comments
Southill																	
Housing Strategy	Refurbish 527 existing housing units	o	o	o	o	o	o	+	+	+	+	o	+	o	+	Mainly positive to neutral long term impacts associated with refurbishment. The standards of existing residential dwellings will be improved in relation to energy efficiency. The current landscape of the urban area is run down and neglected. The physical improvement of existing dwellings will have a visually positive impact on the existing urban landscape. Short-term negative impacts may be felt by the population during the refurbishment phase but these will be temporary in nature.	
	Demolish 199 existing housing units and replace with 209 new homes	o	o	o	o	o	o	+/-	o	+	o	o	+	o	-	Mainly positive to neutral long term impacts associated with demolition & rebuild. There are both positive and negative impacts for the community. Obviously the positives arise from a much higher standard of residential development that increases quality of life. However there could also be impacts arising from the displacement of people out of their community and the breakdown of community structures. This uncertain impact needs to be evaluated further and monitored. The current landscape of the urban area is run down and neglected. The physical improvement of existing dwellings will have a visually positive impact on the existing urban landscape. Short-term negative impacts may be felt by the population during the demolition & construction phase however these will be temporary in nature.	Monitoring of the social impacts associated with the demolition, replacement and new build housing programme should be initiated for future reference. A demolition waste management plan shall be required to facilitate recycling of demolition waste It is noted the LRFIP proposes a number of environmental management standards during construction.
	Provide additional homes through infill development	o	o	o	o	o	o	+	o	+	o	o	+	o	o	This approach to the provision of housing has both positive and neutral impacts.	823 new build units
	Develop greenfield sites for housing	o	o	o	o	o	o	+	o	-	-	o	+	o	o	Development on greenfield land has the potential to alter soil formation and so must be considered to have a potentially negative impact. The LRFIP proposes to provide for new build housing on large expanses of existing open space which are underutilised, poorly located and badly managed. Thus development at such locations is considered to positively contribute to the landscape.	It is noted the LRFIP proposes a number of environmental management standards during construction.

	LRFIP Provisions	B1	B2	B3	W1	W2	W3	PH1	CH1	S1	AC1	N1	LA1	MA1	MA2	Potential Impacts	Comments
Southill																	
	Protect and enhance character of Southill House	o	+	+	o	o	o	+	o	+	+	o	+	o	o	Positive to neutral impacts.	
	Create a new community park at the centre of the community hub	o	o	o	o	o	o	+	o	+	+	o	o	o	o	This proposal would have positive to neutral impacts on the environment.	
Open Space and Public Realm Strategy	Reduce existing public open space provision from 22% of total area to 12% and increase quality	o	?	?	o	o	o	+	o	-	-	o	+	o	o	The impacts associated with this proposal are diverse. Overall whilst a reduction in open space provision may be perceived as having a negative impact other external factors must be considered including the quality of existing space, its usability, its location and its contribution to anti social behaviour. Development on open space is being promoted to address these negative attributes thereby improving overall quality of life so on balance the impacts are likely to be positive to neutral.	
	Restrict development of an old limestone rock quarry filled with domestic refuse	o	o	o	+	+	o	+	o	+	+	o	o	o	o	Largely positive to neutral impact in the long term.	Ongoing management of the site will be in conjunction with the EPA in accordance with the EPA Landfill Management Guidelines

Appendix 2:

Flood Risk Identification for Limerick Regeneration Framework Implementation Plan & Justification Test for St. Mary's Park

1.0 Introduction

To comply with the EU Floods Directive introduced in November 2007 and in line with the Guidelines for Planning Authorities 'The Planning System and Flood Risk Management', an assessment of flood risks has been formally taken into account in the preparation of the LRFIP. The purpose of this Flood Risk Assessment (FRA) is to facilitate regeneration works in Limerick City in accordance with the two Government Orders (No's 275 & 276 of 2007 under the Local Government Services (Corporate Bodies) Act 1971) which established the then Northside and Southside Regeneration Agencies. These functions have since been transferred to Limerick City Council and the Office of Regeneration. The approach to development within the LRFIP is to avoid development in areas at risk of flooding, and where development in floodplains cannot be avoided, to take a sequential approach to flood risk management based on avoidance, reduction and mitigation of risk.

2.0 Methodology

There is a lack of substantive flooding data within the four regeneration areas. At this point in time there are no Catchment Flood Risk Assessment Studies (CFRAMS) and no modelling reports on flood risk assessment for the LRFIP area. However it is understood that a draft CFRAMS may be available in 2014. As stated in the Limerick City Development Plan "until such time as comprehensive information and guidance is available on flooding in the City, a flexible approach is required to take account of flood risk to ensure that appropriate measures are taken wherever the need arises".

In the absence of such comprehensive data, information from a variety of sources has been amalgamated to provide a single indicative flood extent map for the city including the regeneration areas. The information has been collated from a number of sources including:

- 'Floodmaps.ie' – The national flood hazard mapping website operated by the Office of Public Works, where information about past flood events is recorded and made available to the public. 'Flood point' information is available on this site and has been noted;
- Limerick City Development Plan 2010 – 2016 flood mapping and policy;
- Alluvial deposits maps of the Geological Survey of Ireland – indicating areas that have flooded in the past;
- Consultation with the Water Services department of Limerick City Council;
- Aerial photographs and review of detailed flood studies undertaken for specific sites throughout the city.

Following a review of the indicative flood extent map a more detailed flood risk assessment was undertaken for that area located within Flood Zone A where regeneration works were required. The FRA for St. Mary's Park (See Appendix A) was undertaken by Punch Consulting Engineers and has influenced the findings of this overall assessment.

Given the location of much of St. Mary's Park within Flood Zone A, detailed discussions were undertaken with the OPW particularly relating to the emerging data under the CFRAM programme. Indicative data at this stage would suggest that the extent of potential flooding in St. Mary's Park may not be as severe as is currently represented and that a significant area of existing housing may in fact be located in Flood Zone C with the outer lying areas remaining in Flood Zone A. This emerging data has been used to inform this justification test as it represents more accurate information based on available level data sourced from two LiDAR (DTM) datasets as captured for the Irish Coastal Protection Strategy Study undertaken several years ago and then more recently for the CFRAM Programme. As a result two different flood extent maps are produced for St. Mary's Park, with the revised data being the most up to date available information and their assumed flood extents pending publication of CFRAMS

3.0 Background to Limerick Regeneration Framework Implementation Plan

The LRFIP is a strategic document outlining how the Office of Regeneration intends to facilitate and promote significant social, economic and physical development within the defined regeneration areas in the short, medium and long term. The exact location and extent of the regeneration areas as legally defined are identified in Figure 3.1.
Specifically the LRFIP seeks to

- Improve quality of life and well-being for the communities of the regeneration areas by responding comprehensively to their physical, social, community safety and economic problems; and
- Promote the social and economic inclusion of the regeneration areas into the mainstream life of Limerick city.

The LRFIP thereby draws on the Europe 2020 strategic framework of smart, sustainable and inclusive growth. The regeneration programme is a highly dynamic process heavily influenced through community involvement, the participation of public agencies, the availability of public funds and the statutory planning process. The programme therefore has significant cognisance of other funding programmes and spatial strategies.

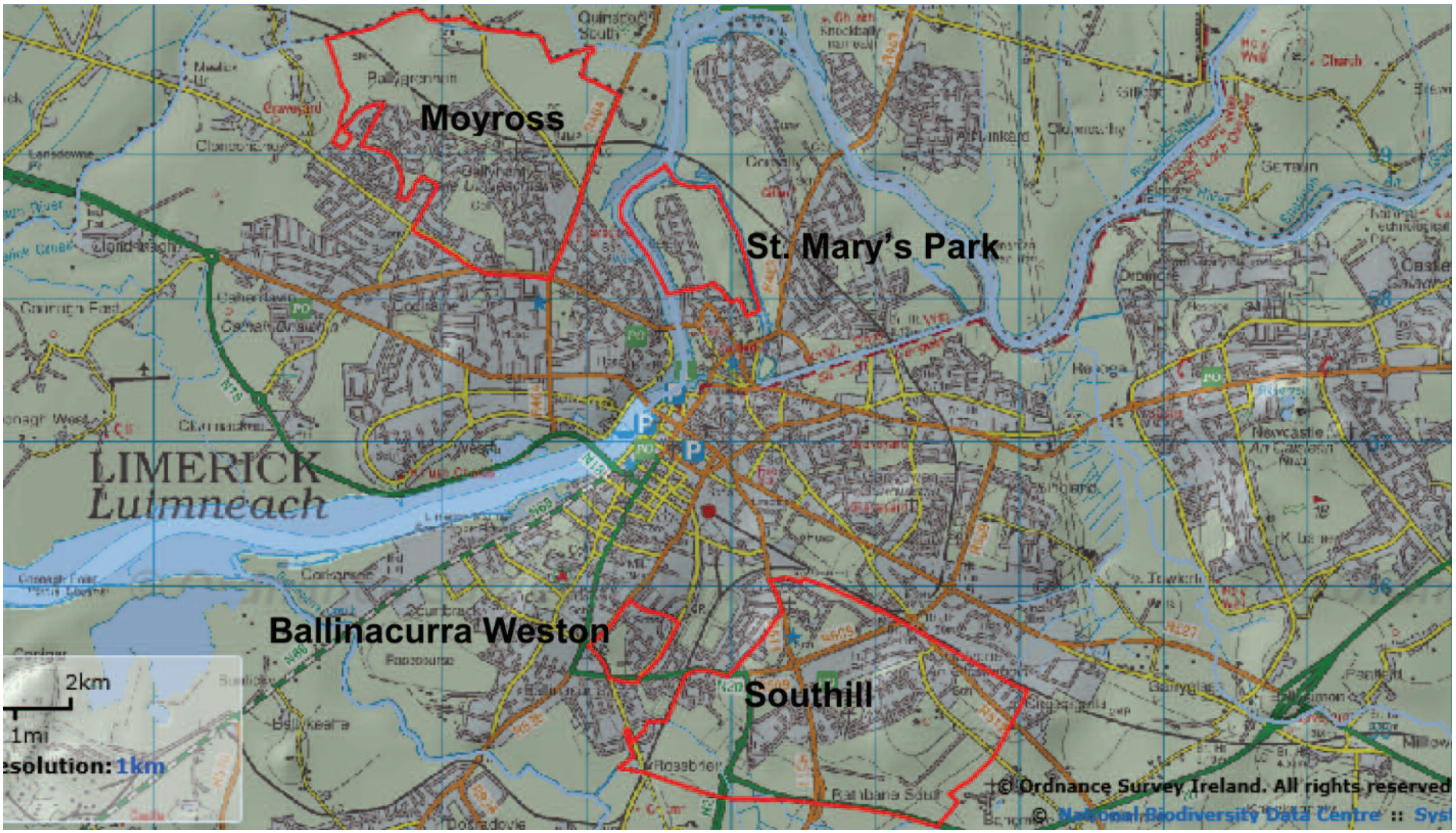

Figure 3.1 Four Defined Regeneration Areas

The LRFIP is a practical and strategic framework plan detailing how the regeneration programme is intended to be implemented. It identifies the issues, objectives and associated programmes and actions that will need to be implemented to facilitate regeneration and deliver real change on the ground. The LRFIP also establishes the parameters and criteria for the processes by which subsequent decisions affecting regeneration will be made. Whilst not a land use plan per se, the LRFIP does contain very specific and detailed physical proposals and improvements to the area. These proposals will of course be subject to the planning application process and thus will be individually assessed in accordance with standard planning requirements. It is intended that the LRFIP will be adopted and given legal effect through a forthcoming review of the Limerick City Development Plan 2010 – 2016 as part of the development plan review process. In effect the proposals within LRFIP will become part of the statutory development plan under Section 11 of the Planning & Development Act 2000 as amended.

The vision and strategy of LRFIP are shaped by an analysis of the socio economic and physical context of each of the regeneration areas and by an analysis of the policy context in the key fields of planning and environment, social and economic policy, taking into account the policy frameworks from EU, through national to local levels. An integrated approach to regeneration has been adopted with specific objectives of the strategy and associated interventions / actions in the LRFIP structured around three pillars: Physical, Social and Economic. Whilst these interventions are developed in detail throughout the LRFIP, the key objectives are detailed in Table 3.1 below and give a flavor of the overall objectives of the LRFIP.

1. Physical	2. Social	3. Economic
Removal of infrastructural barriers to connectivity	Education and learning initiatives over the life course	Sectoral training, work experience / work placement and job placement
Develop connecting routes within regeneration areas	Health and well-being of the population	Economic engagement, platform focused on regeneration areas (multi-stakeholder)
Community safety via design and CCTV monitoring	Ageing well neighbourhoods	Social innovation/social enterprise hubs (support services and new enterprise)
New housing construction, mixed unit size and type to support diversity	Employability and work interventions for groups distant from the labour market	Niche economic activities (working up to intermediate and smart and sustainable growth sectors such as green technology)
Renewal / retrofitting of existing housing	Targeted support for families with difficulties and youth at risk	Develop a knowledge economy sub-sector in community development and community enterprise
Energy efficiency improvements in buildings	Community development, empowerment and capacity building	Inward investment / long term revolving loan financing for new public / social and educational infrastructure
Social and educational infrastructure renewal / adaptation and new build		ICT development to support economic and social development objectives
Landscape, environmental protection and management		

Table 3.1 Core Strategic Objectives Across Sectoral Pillars

St. Mary's Park	Moyross	Ballinacurra Weston	Southill
Demolish 65 no. homes	Demolish 314 no. homes	Demolish 27 no. homes	Demolish 199 no. homes
Refurbish 321 no. homes	Refurbish 451 no. homes	Refurbish 205 no. homes	Refurbish 527 no. homes
Provide 49 no. replacement homes	Provide 295 no. replacement homes	Provide 40 no. replacement homes	Provide 209 no. replacement homes

Table 3.2 Specific Physical Measures in each Regeneration Area

The LRFIP proposes different physical measures within each of the four regeneration areas as detailed in Table 3.2.

4.0 Flood Risk Identifiction

4.1 Fluvial Flooding

The River Shannon, which runs through the study area within the St. Mary's Park Regeneration Area, is both the longest and largest river in Ireland flowing in a south-westerly direction from Cavan towards the Shannon Estuary where it enters the Atlantic Ocean. The catchment upstream of Limerick comprises 10,000km2 including three major lakes, Lough Allen, Lough Ree and Lough Derg. The presence of the lakes and small fall between the outlet of Lough Derg and inlet of Lough Allen has the effect of attenuating flows in the catchment. Downstream of Lough Derg a weir at Parteen splits the flow of the River Shannon with one flow continuing in the natural channel and the other flow diverted down a man made head race to Ardnacrusha generating station. The flow passes through the power station and rejoins the natural channel just upstream of Limerick.

In addition to the River Shannon there are a number of tributaries running through the study area the most significant of these being a sub tributary of the Ballinacurra Creek, which crosses the south western corner of the Southill Regeneration Area.

There have been a number of instances of fluvial flooding in Limerick City centre. The OPW maintains a register of fluvial flood reports (www.floodmaps.ie) and confirms that the most recent of these events occurred in 1999, 2002 and 2009.

4.2 Coastal Flooding

Coastal flooding arises from sea levels which are higher than normal and result in sea water overflowing onto the land. Coastal flooding is influenced by the following three factors which often work in combination, high tide level, storm surges and wave action.

- Astronomical tides vary over time and are predictable. The highest astronomical tides occur in springtides every two weeks. As these tides occur relatively frequently they do not result in flooding. However, these predicted tide levels often differ from observed tide levels due to weather conditions.
- Surges occur relatively frequently off the coast of Ireland however, it is only when the arrival of these surges at the coast coincides with a high tide that storm surges will result in coastal flooding. Once of the most recent significant events happened in February 2002 when a large surge generated by an area of low pressure to the northwest of Ireland coincided with one of the highest spring tides of the year. This resulted in significant flooding in many low lying coastal areas around Ireland.
- A combination of storm surges and high tides may result in the flooding of low lying areas near the coast. However, as the proposed development is located so far inshore wave action is not considered relevant at this site.

Given the presence of tidal sections of the Abbey and Shannon Rivers in the city and within the regeneration areas, coastal flooding must be considered. The highest predicted astronomical tide in the Shannon Estuary is 5.7m Chart Datum (2.67 m Malin) [1] ' . Whilst it is clear that the regeneration areas do not flood during these high astronomical tides, it is noted that predicted tide levels often differ from observed tide levels due to weather conditions particularly storm surges.

4.3 Flood Risk to the Site of the Proposed Development

The predominant flood threat to the regeneration areas lies in the area of St. Mary's Park and arises from coastal flooding associated with the River Shannon and Abbey River. While fluvial flooding has occurred in and around Limerick City in the past, higher flood levels have been noted in the Limerick area from storm surges. It is considered that a tidal storm surge is the dominant critical flooding mechanism for the Limerick City area including the regeneration areas and in particular St. Mary's Park.

4.4 Initial Estimates of Flood Zone and Flood Risk

Flood mapping prepared by Limerick City Council in the preparation of the Limerick City Development Plan places much of Limerick city centre and some outer lying areas in Flood Zone A (at risk in a 1 in 200 year coastal flooding event). Figure 4.1 provides information on two main areas of flood risk including Zone A where there is a high probability of flooding, and Zone B where there is a moderate probability of flooding. This information is represented at a larger scale in Figures 5.1 – 5.5. As previously referenced this map is likely to be refined in the future as more detailed data becomes available, particularly through the CFRAM programme.

In the case of St. Mary's Park, revised data has emerged using the most up to date information available and their assumed flood extents pending publication of CFRAMS. Figure 5.2 shows the 5m and 5.5m contours as they relate specifically to St. Mary's Park. The 200 year (Zone A) level at the most upstream node out in the Shannon estuary is approximately 4.6m, while the 1000 year (Zone B) level at the same node is approximately 5m. The 5m and 5.5m contours on Figure 5.2 would therefore, based on this assumption, approximate to the Zone A and Zone B extents respectively.

[1] Source: Flood Risk Assessment for St. Mary's Park - Punch Consulting Engineers, 2013

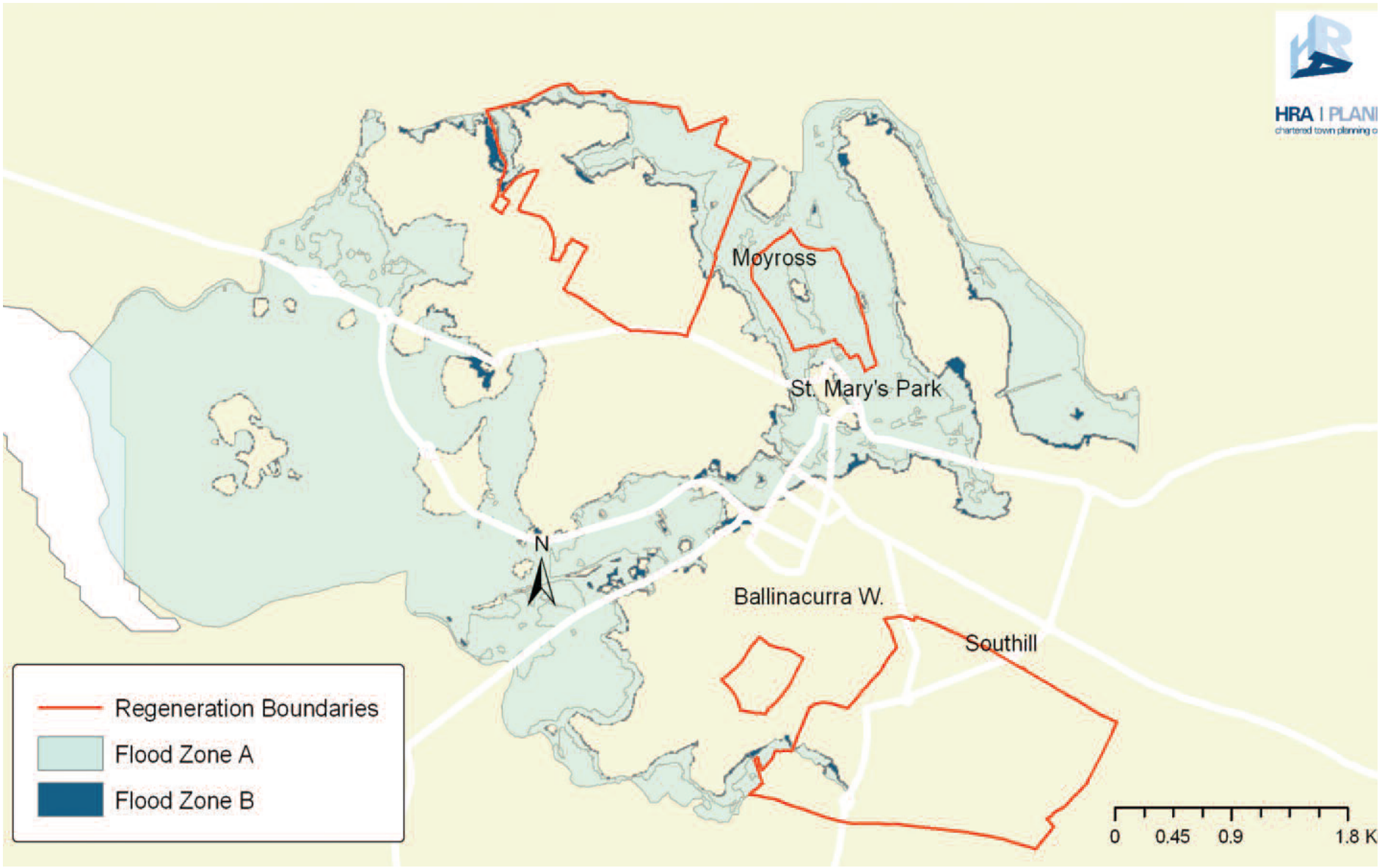

Figure 4.1 Extent of Potential Flooding in Limerick City including the defined Regeneration Areas

5.0 Initial Flood Risk Assessment

The four regeneration areas propose different development works and extent of development as detailed in Table 3.2 . It is therefore proposed to undertake an initial flood risk assessment on each of the areas.

5.1 St. Mary's Park

With reference to Figure 5.1 which is the defined flood extent as per the Limerick City Development Plan, St. Mary's Park regeneration area is completely located within Flood Zone A with the exception of a small island located within the St. Mary's Park housing estate footprint. With reference to Figure 5.2 and the most up to date information available and their assumed flood extents pending publication of CFRAMS, the small island becomes significantly larger although a large proportion of the regeneration area still remains in Flood Zone A.

It is proposed to demolish, refurbish and provide infill housing within St, Mary's Park. Specifically it is proposed to demolish 65 no. homes within Flood Zone A. With reference to Figure 5.1 only 10 no. replacement homes are located within Flood Zone C with 39 no. replacement homes in Flood Zone B and A. In contrast and with reference to Figure 5.2 a total of 21 no. houses are proposed within Flood Zone C with 28 no. replacement houses in Flood Zone and B. As these lands are being promoted for residential use which is a use that is vulnerable to flooding and is deemed as "highly vulnerable development" as set out in Table 3.1 of the Planning System and Flood Risk Management Guidelines for Planning Authorities, it is necessary to demonstrate 'exceptional circumstances' and apply the Justification Test as detailed in section 6.0 below.

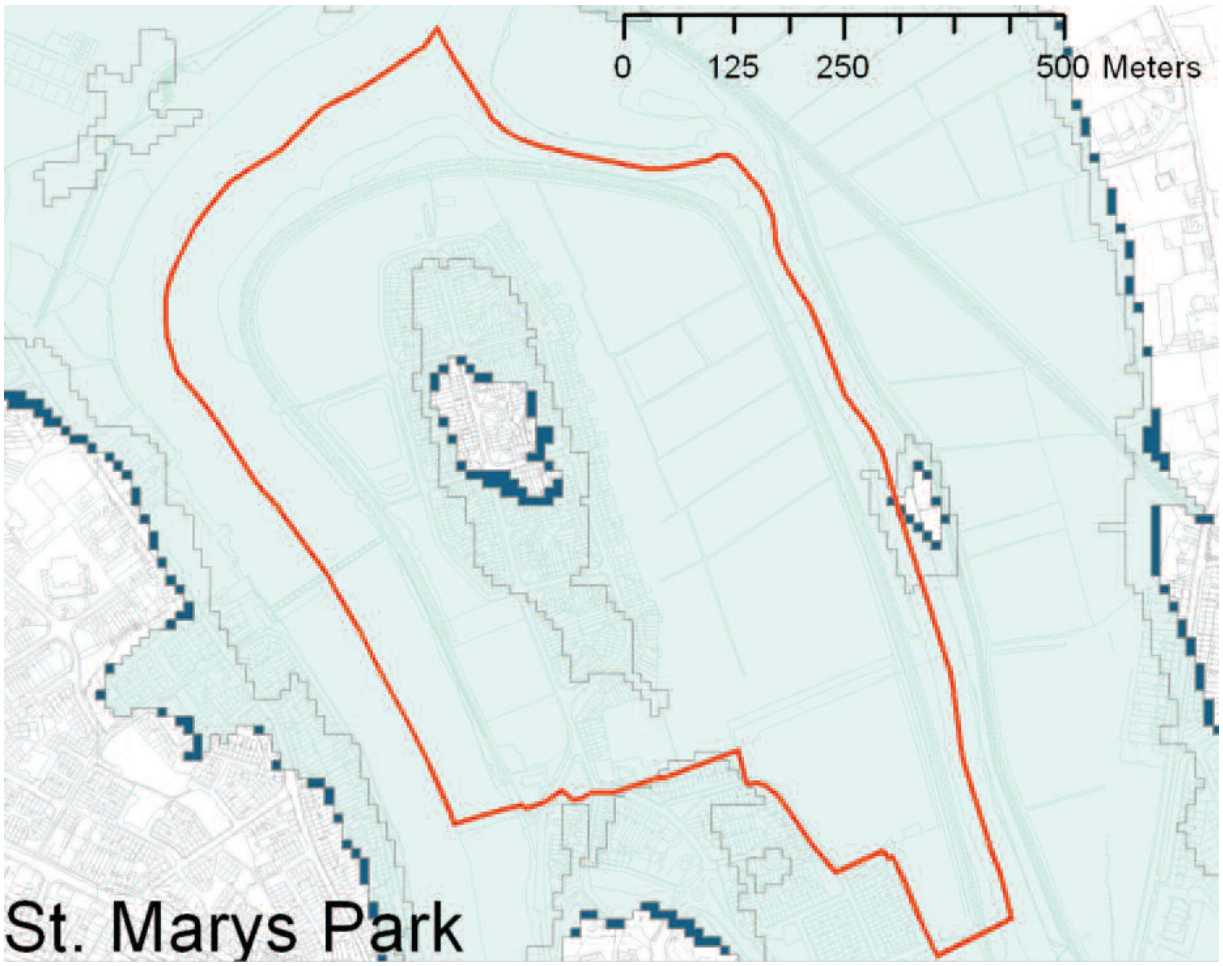

Figure 5.1 Extent of Flooding in St. Mary's Park as per information contained in the Limerick City Development Plan

Figure 5.2
Extent of Flooding in St. Mary's Park using most up to date information available and their assumed flood extents pending publication of CFRAMS.

5.2 Moyross

A significant extent of the regeneration area within Moyross falls within Flood Zone A. A precautionary approach has been adopted in accordance with the Guidelines and future development works within Moyross avoids areas at risk of flooding. Thus it is not proposed to provide for any replacement / new build dwellings within the flood zone with all undeveloped areas within the flood zone remaining as either open space or a greenfield site.

It is however proposed to refurbish a number of properties which are already located within but at the edge of the flood zone, namely the eastern and southern extremity of Sarsfield Gardens. However as the works purely comprise refurbishment works and do not comprise new build, the net effects of and to flooding to these properties poses no greater or increased risk than if the properties were not refurbished. In coming to this conclusion it is acknowledged that refurbishment of residential properties in most instances would generally not require the benefit of planning permission and therefore would not be subject to normal planning considerations (including flood risk assessment). Since such works concern existing buildings the sequential approach cannot be used to locate them in lower-risk areas and the Justification Test does not apply.

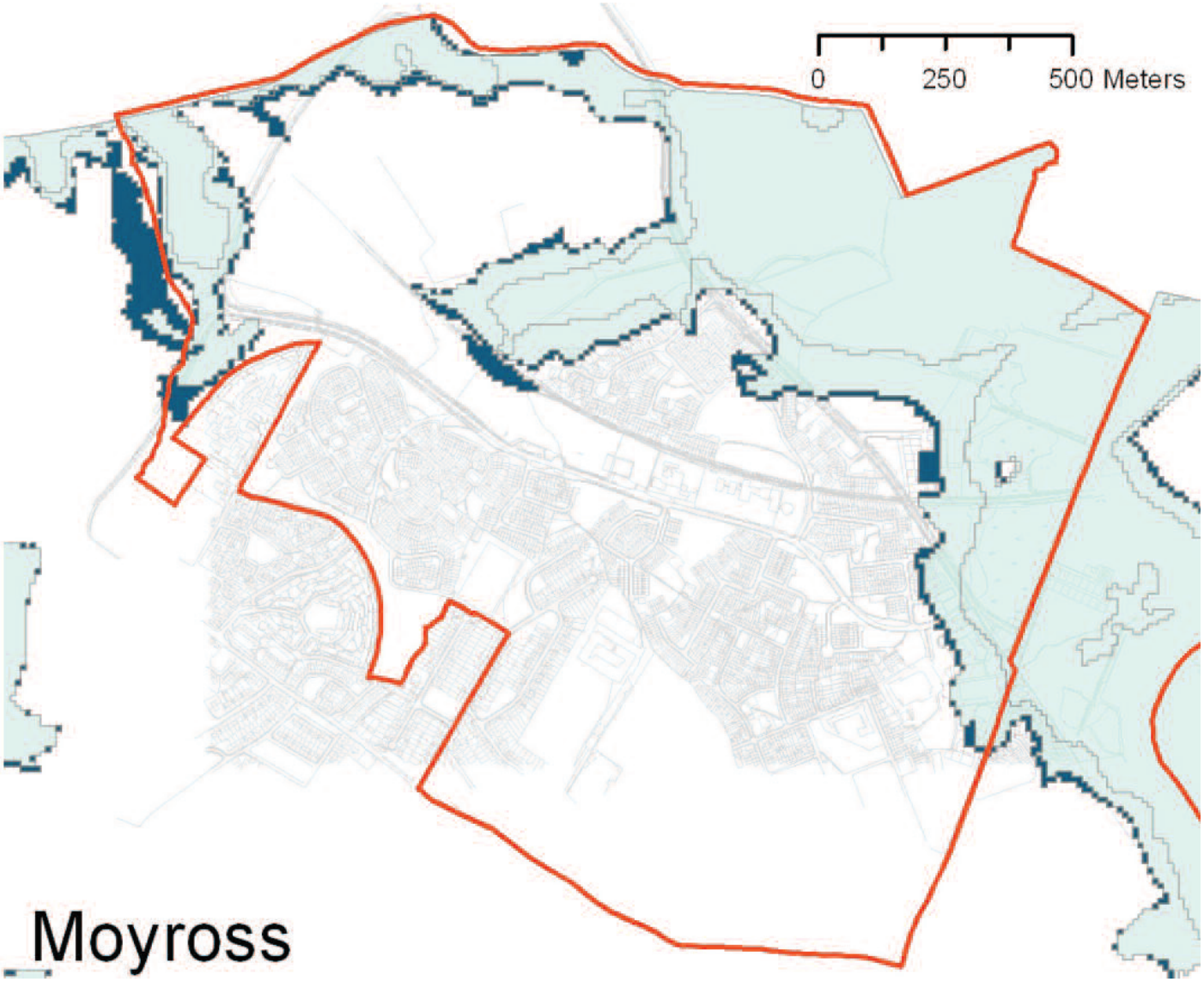

Figure 5.3
Extent of Flooding in Moyross as per information contained in the Limerick City Development Plan

5.3 Ballinacurra Weston

The Ballinacurra Weston regeneration area is located outside of the defined area at risk of flooding and is neither located within Flood Zone A or Flood Zone B.

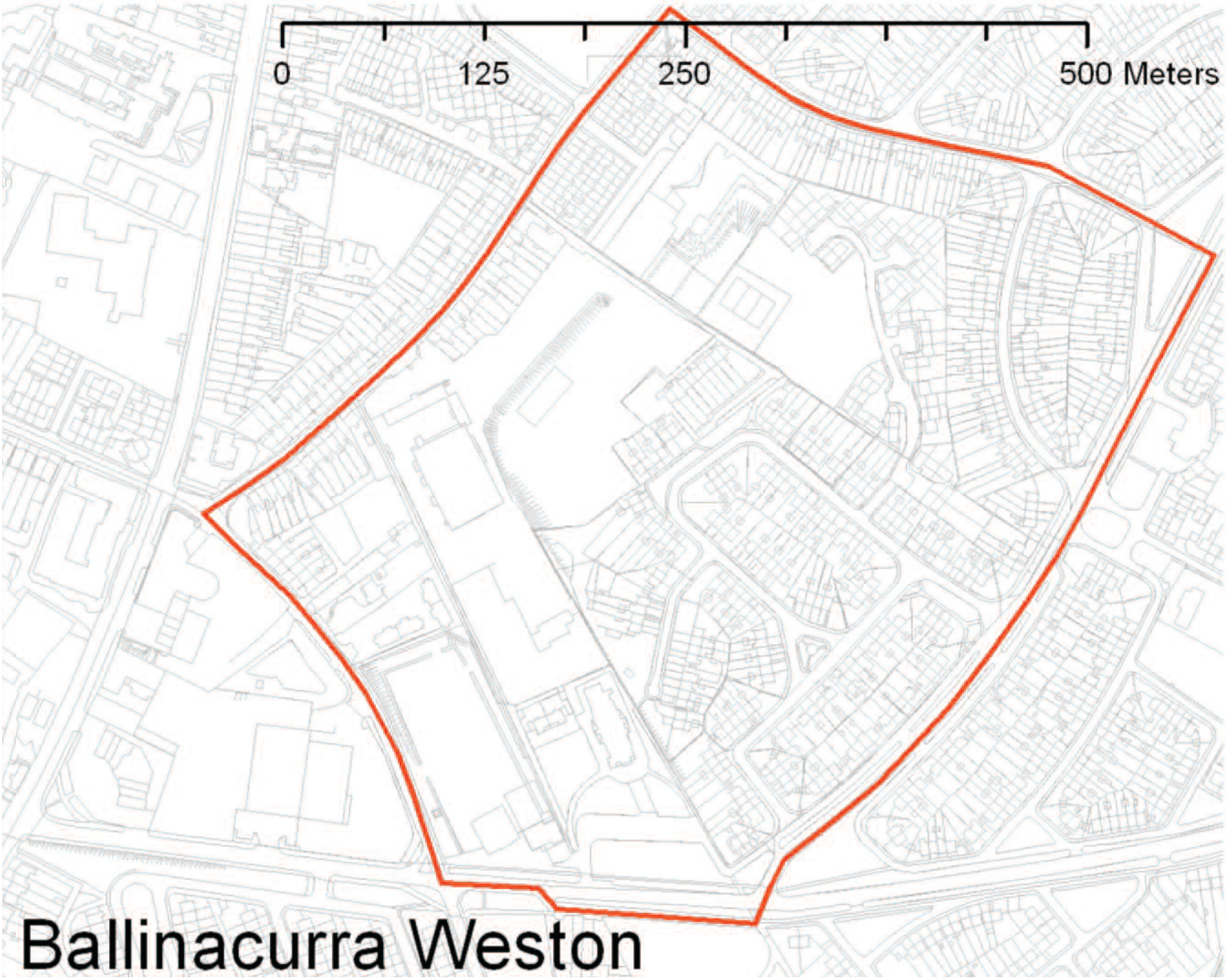

Figure 5.4 Extent of Flooding in Ballinacurra Weston as per information contained in the Limerick City Development Plan Development Plan

5.4 Southill

Most of the regeneration area within Southill is located outside the defined area of flood risk with the exception of an area of land located on the northern side of a tributary of the Ballinacurra Creek. The area of flood risk is located on the western side of the Rosbrien interchange away from the proposed development works within the LRFIP which are located to the north east of the interchange. A precautionary approach has been adopted in accordance with the Guidelines with the defined area of flood risk remaining undeveloped. It is thus not considered necessary to progress to the

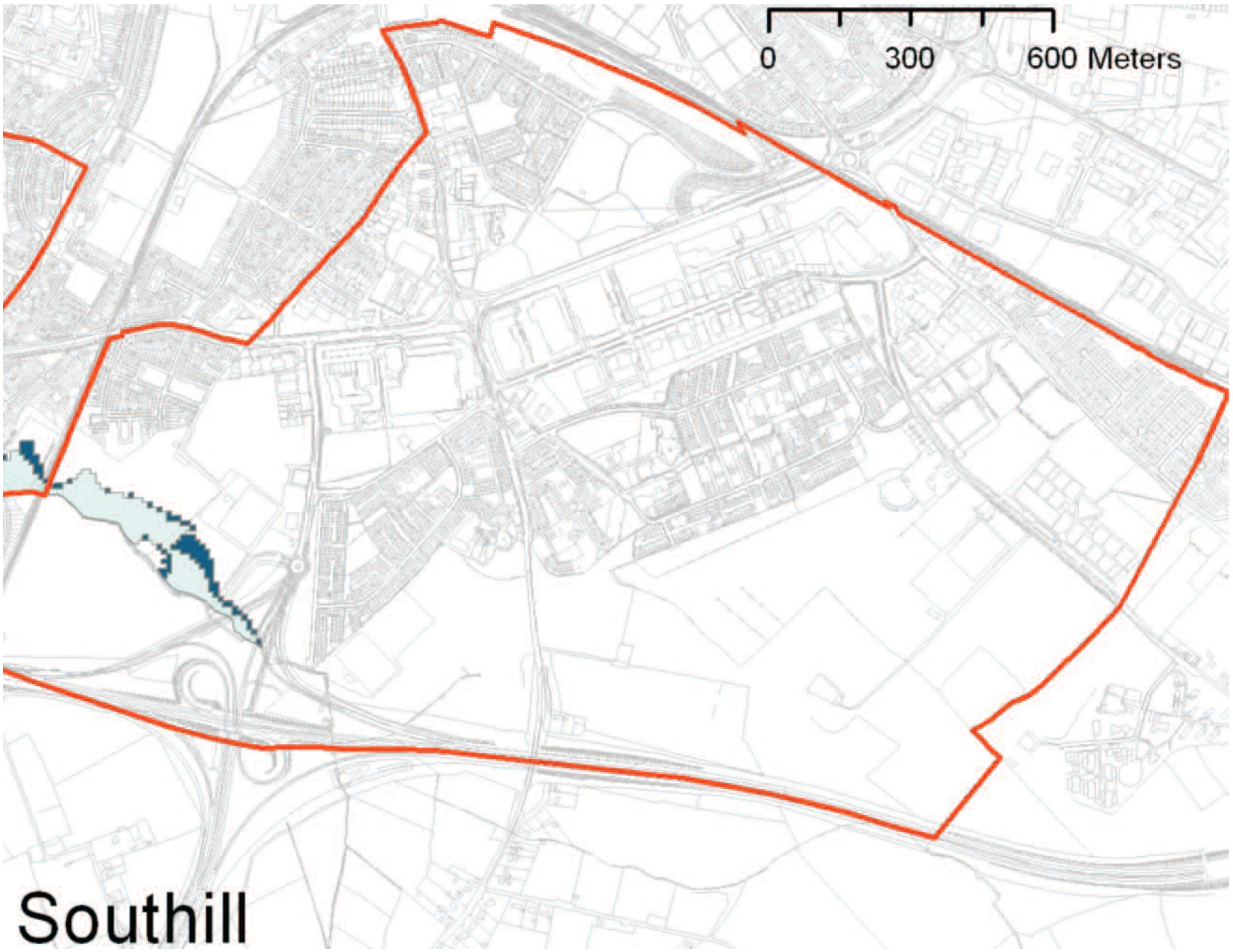

Figure 5.5 Extent of Flooding in Southill

Justification Test as it is not required.

6.0 Justification Test-St. Mary's Park

Development works in St. Mary's Park Regeneration Area are proposed on lands which are located within a potential flood risk area. The extent of flood areas within St. Mary's Park has been determined using revised up to data and their assumed flood extents pending publication of CFRAMS. The extent of work in the context of the most up to date available flood information is detailed in Figure 6.1 Such works are classified as comprising highly vulnerable uses to flooding and therefore it will be necessary to undertake and pass the Justification Test which is outlined in The Planning System and Flood Risk Management - Guidelines for Planning Authorities. It must be noted that to pass the Justification Test all of the criteria detailed in Box 4.1 of the Guidelines must be satisfied.

With reference to Figure 6.1 a total of 21 no. houses are to be built as replacement homes on infill sites vacated through the demolition of older housing units, all located within that area of the existing housing estate located within identified Flood Zone C. In addition some 27 no. replacement homes are to be provided in Flood Zone A, again on brownfield sites which have arisen as a result of the demolition of older units. An extensive programme of

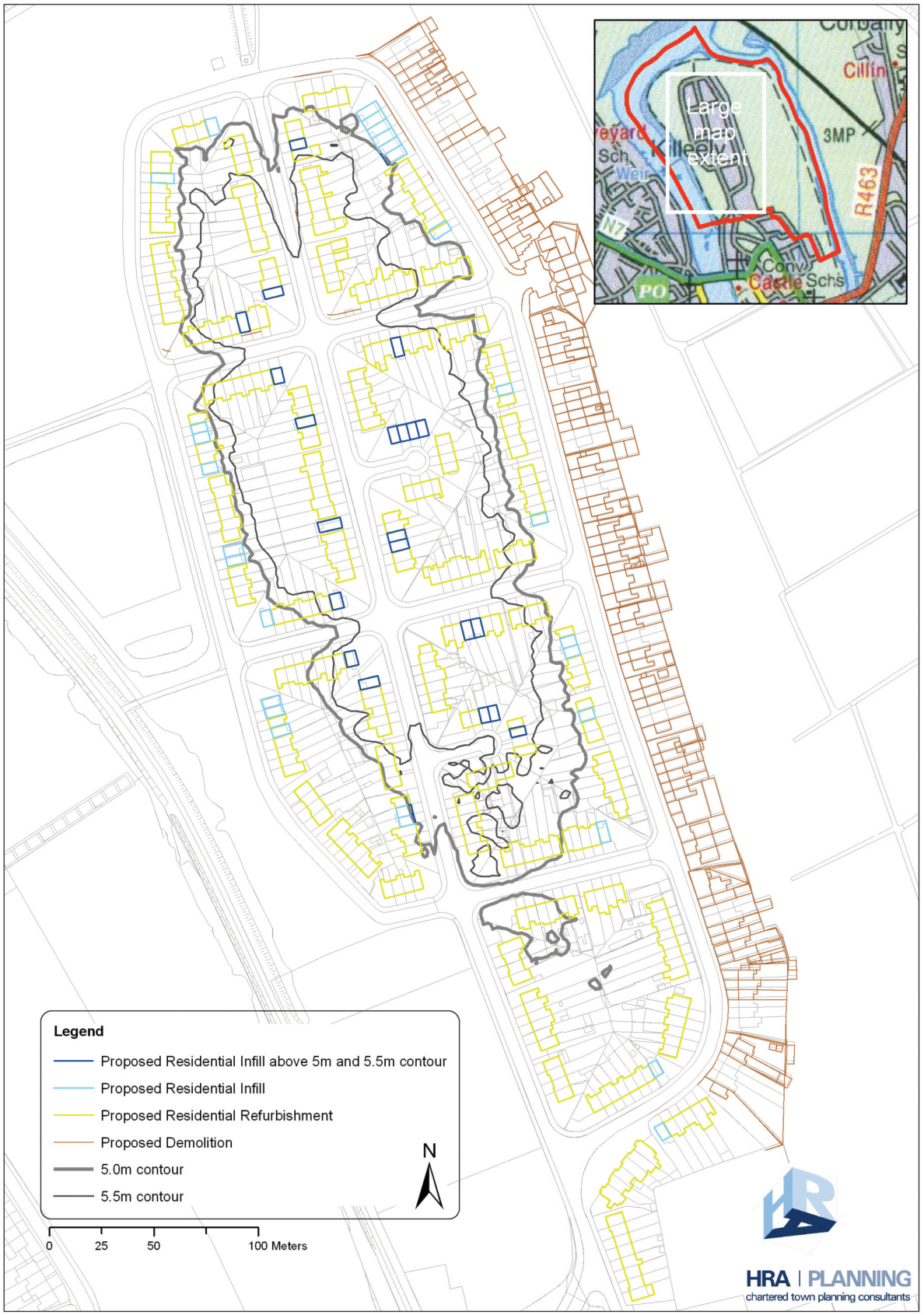

Figure 6.1
Proposed Works in St. Mary's Park in the context of revised and most Up To Date Data on Flooding

refurbishment is also proposed to existing housing units within both Flood Zone A, B and C.

The Justification Test requires that three criteria are satisfied and it is proposed to answer each of these criteria individually as detailed below. However in advance of consideration of each of the criteria it must be noted that the area of lands to be developed within the St. Mary's Park are appropriately zoned for residential use in the Limerick County Development Plan 2010 – 2016. Thus, in order to have secured such residential zoning these lands would already have undergone a flood risk assessment and justification test, thereby confirming the suitability of such lands to accommodate residential use. It is thus important, that this justification test is considered in light of the existing residential zoning afforded to the land.

6.1
The urban settlement is targeted for growth under the National Spatial Strategy, regional planning guidelines, statutory plans as defined under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act, 2000, as amended.

Not only is the urban settlement of Limerick City targeted for growth at a national, regional and local level but so too are the regeneration areas. There is overwhelming evidence to demonstrate that population growth must occur within the regeneration areas if Limerick City is to achieve critical mass and the population targets allocated to the city.

Limerick city is a designated 'Gateway' in the National Spatial Strategy (NSS). As a 'Gateway' Limerick City is the focus for population and economic growth in the Mid-West region and the designation gives effect to the development of the city as a national and regional engine of growth. Some of the key aspects of the NSS which have influenced the LRFIP are the:

- spatial structure set out in the strategy in relation to the Mid-West region including the designation of the Limerick/Shannon Gateway;
- role of Gateways and the need for critical mass;
- role of linkages in terms of good transport, communications and energy networks;

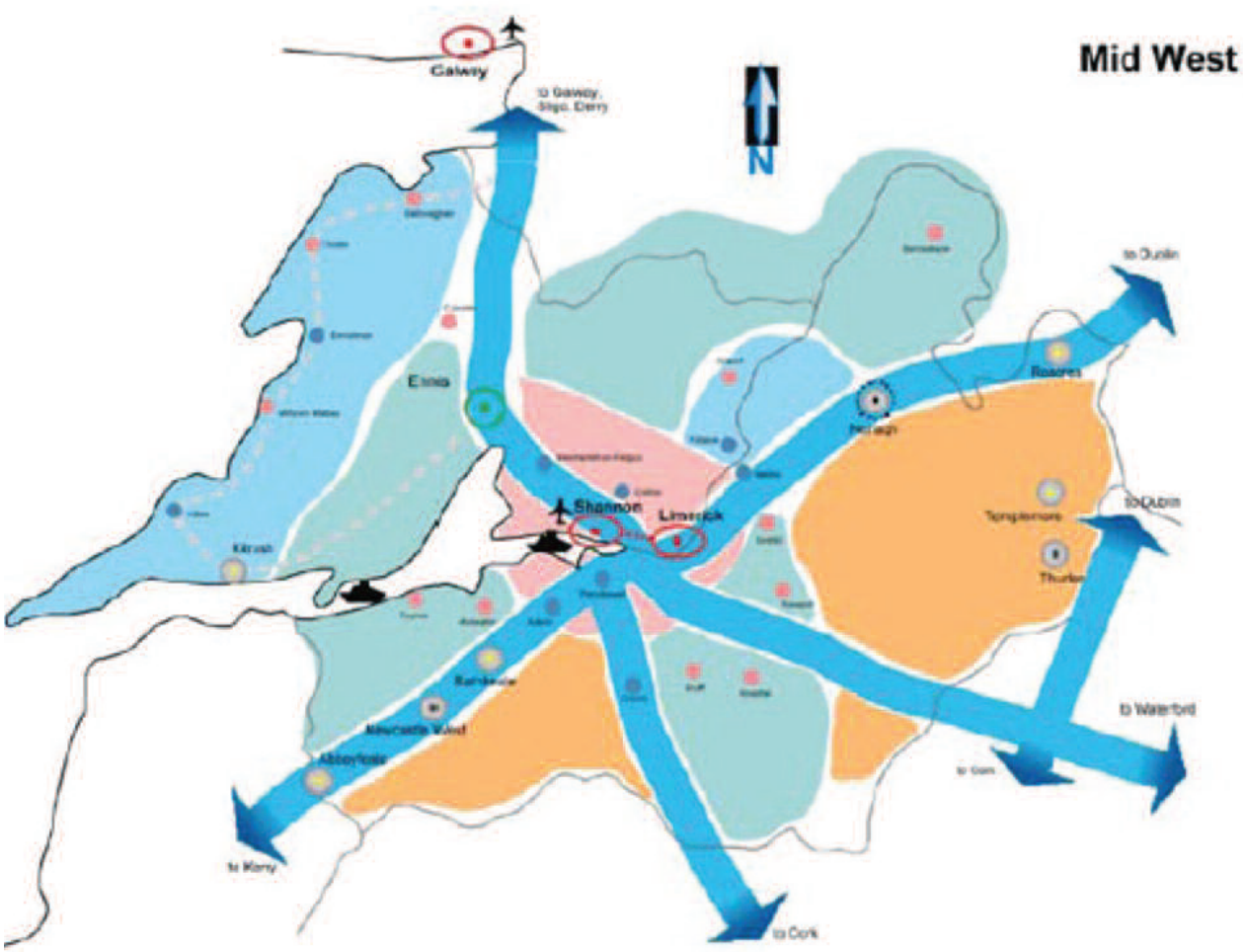

Figure 6.2
NSS Map of the Mid West Region

- suggested range of policy responses to strengthen communities; and
- the need for effective integration of land use and transportation policy within the spatial structure of urban areas.

The Atlantic Gateways Initiative is based on the NSS and aims to mobilise the gateways of Waterford, Cork, Limerick and Galway through interaction and collaboration to create a critical mass in the regions to balance that of Dublin. One of the central tenets of this initiative is to maintain population and economic growth to facilitate the required critical mass required. This collaborative approach to population and economic growth including planning and promotion to develop a second major metropolitan corridor on the island of Ireland is also acknowledged in the National Development Plan 2007-2013.

Within the policy framework of the NSS and the Atlantic Gateways Initiative, the Regional Planning Guidelines 2010 to 2022 (RPGs) sets out a detailed development strategy for the Mid-West region. The RPGs prioritise the development of the Gateway and Hub (Limerick City & Shannon) to achieve the critical mass and value-added investment which the wider region requires. The RPGs identifies a 'Zone' based strategy for the region and proposes that the identified zones be developed in ways that reflect their particular characteristics. Zone 1 which includes Limerick City is the core area of the region and one of the key requirements for this Zone as set out in the RPGs is to consider how residential development will be accommodated on brownfield and redevelopment sites as well as in greenfield locations. The RPGS also acknowledges the City has faced a loss of population in recent years and that the loss of population has had an impact on the nature and scale of the services that the City can support. It prioritises a stronger central core in terms of the spatial structure for the region including re-population of the city.

The Limerick City Development Plan 2010 - 2016 (CDP) sets out Limerick City Council's policies for the development of Limerick City to 2016 and beyond including the regeneration areas. The CDP confirms that up to 70% of the increase of the population for the Limerick/Shannon Gateway has been allocated to Limerick City thereby mandating the need to support considerable future public investment in regeneration in the City. The CDP proposes to increase population by 21,450 persons by 2022, thereby necessitating the provision of an additional 9,149 residential units. Existing undeveloped land in the city (excluding Regeneration Areas) has the potential to accommodate 5,678 units and the CDP states that the regeneration areas have an indicated capacity of 4,400 additional units (133 hectares). The CDP states that "given the compactness of the city it is not possible to prioritise areas other than the regeneration areas" and have committed the provision of 2,000 additional units prior to 2016 with the balance of 2,400 provided in the period after that. Whilst the delivery of 2,000 new residential units within the Regeneration Areas prior to 2016 is not likely, having regard in particular to the current economic situation, the LRFIP seeks to ensure that it continues to facilitate the provision of such units. The Regeneration Programme is therefore particularly critical to redirecting population growth into Limerick City and to the success of the Gateway overall.

The Limerick and Clare Joint Housing Strategy 2011 to 2017 prioritises the Limerick/Shannon Gateway, followed by Ennis, as the primary locations in the region for residential development. In the Gateway, the growth of the City is prioritised to rebalance recent patterns of development which saw significant population increase in the Limerick Suburbs. The Strategy acknowledges that the NSS and RPG population targets are ambitious, particularly as there has been a sudden slowdown in housing output. The Strategy finds that the Regeneration Programme in particular is critical to redirecting population growth into Limerick City and to the success of the Gateway overall. It finds that insufficient growth in the Regeneration Areas would have serious implications for the implementation of regional and national policy.

On the basis of information presented above, it is considered that these criteria can be satisfied and that the urban settlement of Limerick City, but more specifically the regeneration areas have been targeted for growth at a national regional and local level. In fact it has been comprehensively demonstrated that there is overwhelming evidence to demonstrate that population growth must occur within the regeneration areas if Limerick City is to achieve critical mass and the population targets allocated to the city

6.2
The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and, in particular:

6.2.1
Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement

The regeneration area comprising St. Mary's Park was legally defined in 2008 with the establishment of then Northside Regeneration Area (functions since transferred to Limerick City Council) with the specific purpose of facilitating regeneration works. If the works of refurbishment and infill new build are not permitted within the regeneration area then the regeneration works can not be facilitated.

Limerick City has an ageing house stock and this is particularly evident in the Regeneration Areas where just under 4% of all housing has been constructed since 1990. St. Mary's Park has the oldest housing stock with 69% of the housing constructed before 1945. The age of the existing housing stock means that a lot of housing in the area is not fit for purpose and at a minimum requires extensive refurbishment.

Due to the age of the housing stock in St. Mary's Park and its poor condition some 78 no. residential units have already been demolished within the regeneration area. This demolition work did not occur in any one location but rather occurred sporadically throughout the regeneration area on a needs basis and has resulted in significant 'gap' infill sites throughout the built footprint of St. Mary's Park. As a result there is no cohesive built form to development in St. Mary's Park and new infill development is required to regenerate the built

form.

However, such demolition work has not only impacted on the built physical environment but it has also impacted on the social environment. The total population within the St. Mary's Park regeneration area has fallen by 28% between 2006 and 2011 from 1211 persons to 874 persons. Whilst it is acknowledged that population loss from local authority housing estates is a long term trend, it is considered that a lot of the population loss in St. Mary's Park is as the result of regeneration work and associated demolitions. However regeneration was never intended to displace families and/or communities and thus it is important that replacement housing is provided to accommodate those families originally displaced. The provision of replacement / new housing is also necessary to facilitate and encourage appropriate social mix. St. Mary's Park has a high elderly dependency rate of 21 per cent and when examined in conjunction with the youth dependency ratio, the overall dependency ratio in the St. Mary's Park is highest of all the regeneration areas at 60 per cent. Regeneration of St. Mary's Park will not occur until a better social mix and balance is achieved and the high dependency ratio becomes more in line with the city wide average of 26 per cent. This can and will only be facilitated by attracting new families into the area through the provision of new build properties and retaining existing middle aged families in good quality housing.

Whilst achieving better social mix and lowering low dependency ratios is a long term ambition of regeneration for St. Mary's Park there will be a more immediate and pressing need for infill / replacement housing. A detailed study of the area necessitates the demolition of a further 65 no. homes east of St. Munchin's Street, all located within Flood Zone A. These houses, constructed in a monotonous row along the street back onto the Special Area of Conservation (SAC) which is a large expanse of undeveloped natural habitat that will never be developed in the future. The rear of these houses has become a dumping ground for rubbish and essentially resembles a significant landfill within a residential area. The difficulty with rubbish at this location continues to persist and thus in an effort to finally address the situation it is proposed to demolish the remaining 65 no. units fronting onto St. Munchin's Street. Once these units have been demolished a total of 143 no. houses will have been demolished in St. Mary's Park.

Of the 65 no. units being demolished 42 no. units are occupied and these 42 no. families do not want to relocate but want to remain living in the area that they have grown up in with their family and neighbours. Extensive consultation has been undertaken with the community of St. Mary's Park and thus to facilitate the regeneration of St. Munchin's Street, at least 42 no. replacement homes must be provided within the existing built fabric of St. Mary's Park. To further complicate the situation there is also a need for additional housing to address overcrowding, estimated to require 32 no. additional units.

Thus, as can be seen for regeneration to function within the St. Mary's Park area a process of refurbishment and new 'infill' build shall be required to achieve the proper planning and sustainable development of the urban settlement.

6.2.2 Comprises significant previously developed and/or under-utilised land

Having regard to the location of St. Mary's Park regeneration area within a flood zone as identified in Figure 6.1, a precautionary approach to new build development is being adopted such that no new greenfield sites are being developed.

All proposed works within St. Mary's Park regeneration area is to occur on existing brownfield land primarily generated through the demolition of existing units under the previous regeneration programme. This land is considered to be prime urban land in proximity to the city centre which needs to be holistically developed to repopulate the city centre and to make most efficient use of the scarce resource. Concentrating development on brownfield sites (previous housing sites) within St. Mary's Park regeneration area encourages more sustainable lifestyles by providing an opportunity to recycle land and assist environmental, social and

economic regeneration. It is anticipated that the cleanup and redevelopment of the sites will impact positively on the local economy by creating a safer, healthier urban space to house residences.

6.2.3
Is within or adjoining the core of an established or designated urban settlement

The St. Mary's Park regeneration area adjoins the commercial core of Limerick City centre as detailed in Figure 6.3. It has already been demonstrated in section 6.1 that Limerick City is designated as a 'Gateway' at national level and therefore can be classified as an established and designated urban settlement.

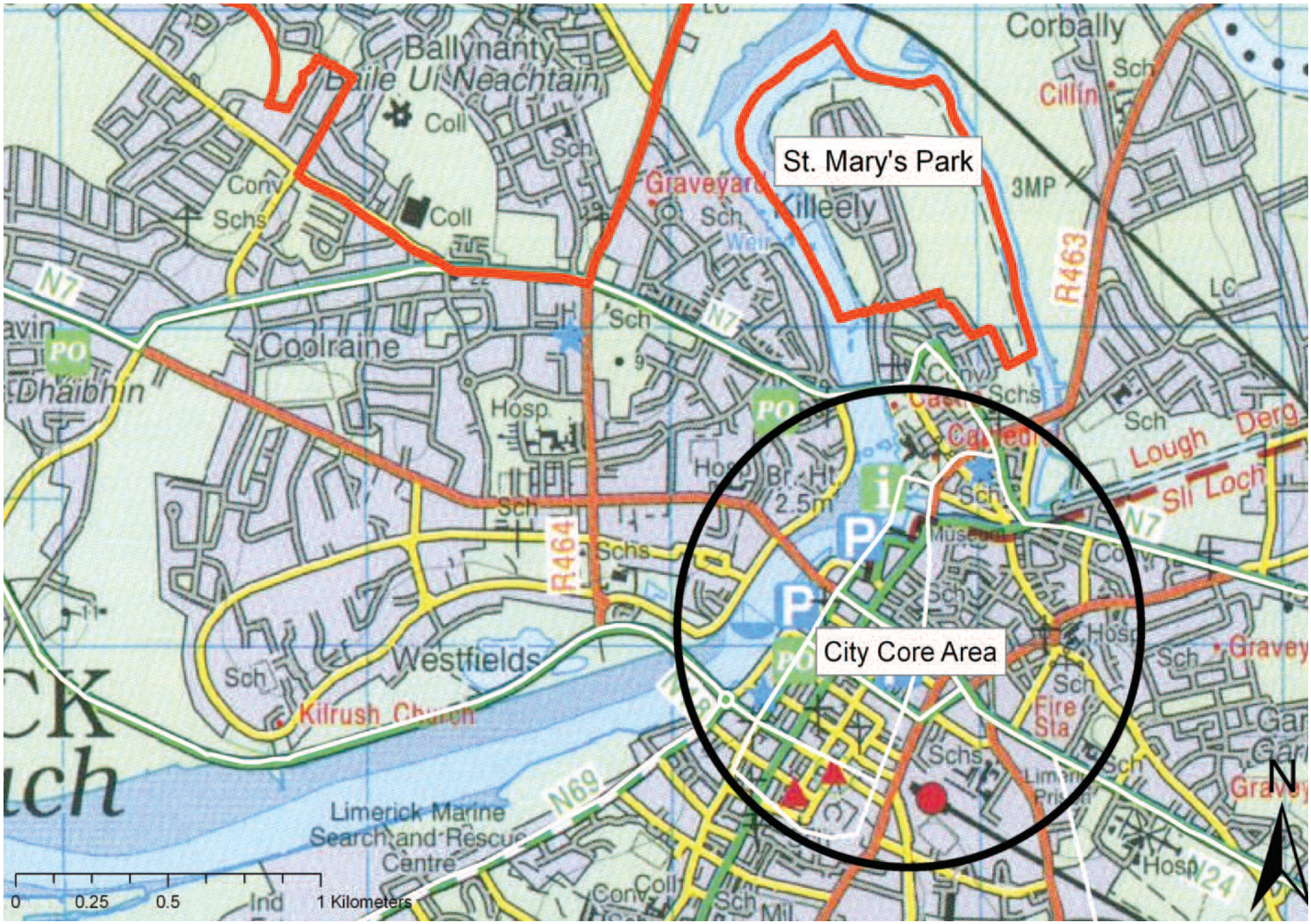

Figure 6.3 Relationship of Regeneration Area to City Core

6.2.4
Will be essential in achieving compact and sustainable urban growth

Regeneration works within St. Mary's Park is critical and necessary to achieve compact and sustainable urban growth within the regeneration area but also within the city centre of Limerick. The works are not only necessary to improve the quality and sustainability of living in St. Mary's Park but it is also necessary to facilitate the redevelopment of the wider Kings Island area which is a core objective of the CDP.

St. Mary's Park and the wider Kings Island area is surrounded by water (River Shannon and Abbey River) and so is disconnected from the city core. Nicholas Street (located outside but connected to the regeneration area) was once a busy thoroughfare and comprised the Main Street of Limerick City. Gradually, the emphasis of the city moved southwards across the Abbey River to the city centre as we know it today. Overtime Nicholas Street has become insignificant in terms of economic activity and its vitality and viability has been substantially and adversely impacted. Such a fall in status and significance has resulted in a feeling of 'isolation' on Kings Island as its one time service centre has now fallen into a state of idleness. The CDP identifies the area surrounding King John's Castle, Nicholas Street and Mary Street (adjoining the regeneration area) as a 'Special Planning Control Area' which seeks to create a new dynamic living area in the heart of the city accommodating additional shopping, living and cultural facilities. However this objective can and will not be achieved in isolation and without the critical regeneration works within St. Mary's Park. This area of the city needs investment and redevelopment along with social and economic intervention to address existing social problems and anti-social behaviour and without such investment the objectives for a compact and sustainable city centre can not be achieved.

A comprehensive approach to integrated development on this side of the city centre is required and it is for this reason that the legally defined regeneration boundary area can not be promoted in isolation. The LRFIP looks beyond the legally defined regeneration boundary in its proposals for regeneration as it acknowledges that the redevelopment of St. Mary's Park can not occur in isolation from the wider redevelopment of Kings Island and Nicholas Street. For this reason alone the regeneration works proposed within St. Mary's Park regeneration area are essential in achieving compact and sustainable urban growth and in achieving a core objective of the CDP in relation to the defined 'special control area'.

Another reason why the regeneration of St. Mary's Park is so critical to achieving compact and sustainable growth is its relationship with securing implementation of the core strategy within the CDP. The CDP proposes to increase population by 21,450 persons by 2022, thereby necessitating the provision of an additional 9,149 residential units in the city. The CDP states that "given the compactness of the city it is not possible to prioritise areas other than the regeneration areas". Thus the regeneration programme including St. Mary's Park is critical in terms of enhancing the attractiveness of these areas as a place for investment and living, thereby encouraging residential growth within the regeneration areas. If the proposed works were not to be facilitated within St. Mary's Park it could be argued that the decision goes against the core of development plan policy as set out in the CDP as the area would continue to encounter sustained population loss (28% from 2008 – 2011) and not growth contrary to the provisions of the CDP.

6.2.5
There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.

In response to this criterion there is little flexibility with regard to the proposed regeneration works and the overall objectives associated with the regeneration programme. The works proposed within St. Mary's Park are very specific and are aligned to a legally defined regeneration area. Associated with a very specific regeneration programme, with specific funding allocation and tied to a specific legally defined area these works can not be transferred to another area within or adjoining the core of the urban settlement.

However in addition to this very simple answer there are of course other reasons why no suitable alternative lands exist for this particular use. The proposed works within St. Mary's Park partially comprise rejuvenating the built environment by a mixture of demolition, construction and refurbishment of dwellings having regard to urban design guidelines. The demolition of units is necessitated due to the age of existing housing stock (69% constructed prior to 1945) and also having regard to best urban design principles. To date some 78 no. units have been demolished under the previous regeneration programme and it is proposed to demolish an additional 65 no. units resulting in a total demolition figure of 143 no. units. Having regard to best urban design guidelines and the establishment of high quality and sustainable residential environments it is necessary to infill the existing gap sites with the provision of 49 no. new build units. Failure to infill these sites will result in a pour quality urban environment which would be contrary to the overall principles and objectives of regeneration.

Of course there is also a requirement in regeneration works to focus on a strategic multi faceted approach to address the range of social, educational and economic issues that may be evident. Thus extensive consultation has been undertaken with the residents of St. Mary's Park and these residents have made it clear that they do not want to leave their community in order to facilitate demolition and physical enhancement works. It is thus absolutely necessary that these people are 'rehoused' within their local community and not redirected to another area of the city. To date a significant element of regeneration funding has been spent on relocating families out of the regeneration areas and as Minister O'Sullivan has stated "the emphasis now had to be on delivering new homes for people" (20th January 2012 "Limerick Regeneration must Refocus"). The other reasons, as mentioned previously is to provide additional units to satisfy overcrowding within existing housing units; to potentially re-house families that already left the area following demolition

and to facilitate social mix by attracting new families into the area. Undertaking the proposed works in other areas of the city adjoining the city centre is thus not possible as it directly goes against the principles of social regeneration in maintaining thriving community structures.

The whole of St. Mary's Park regeneration area is located within the predicted flood area as detailed in the Limerick City Development Plan with the exception of an island of existing houses in the centre. The area immediately adjoining the defined regeneration area on Kings Island is also mostly within an area defined as being subject to flooding, again with the exception of an island of existing development (see figure 6.4). This 'island' area located outside of the potential area of flood risk is already heavily developed and whilst it may have the potential to accommodate limited infill, it is not capable of accommodating the volume of replacement housing required having regard to the immediate need for replacement housing, the need arising from existing overcrowding and internally generated need going forward. There are thus no alternative sites available within St. Mary's Park regeneration area or the immediate adjoining area, which are at a lower risk of flooding to facilitate existing and future housing.

There are of course possible alternative lands available for residential development adjoining the city centre in an area not liable to flood risk (Zone C) and which could potentially accommodate residential development. However these sites:

- Are not located within the legally defined regeneration boundary for St. Mary's Park;
- Are unlikely to be in the ownership of the Council and thus are unlikely to be capable of delivering replacement housing in the short term;
- Are removed from the existing community structure of St. Mary's Park and therefore are unsuitable on social grounds; and
- Are isolated from the area undergoing regeneration.

It is thus considered that there are no suitable alternative lands to accommodate replacement housing, in areas at lower risk of flooding within or adjoining the core of the urban settlement.

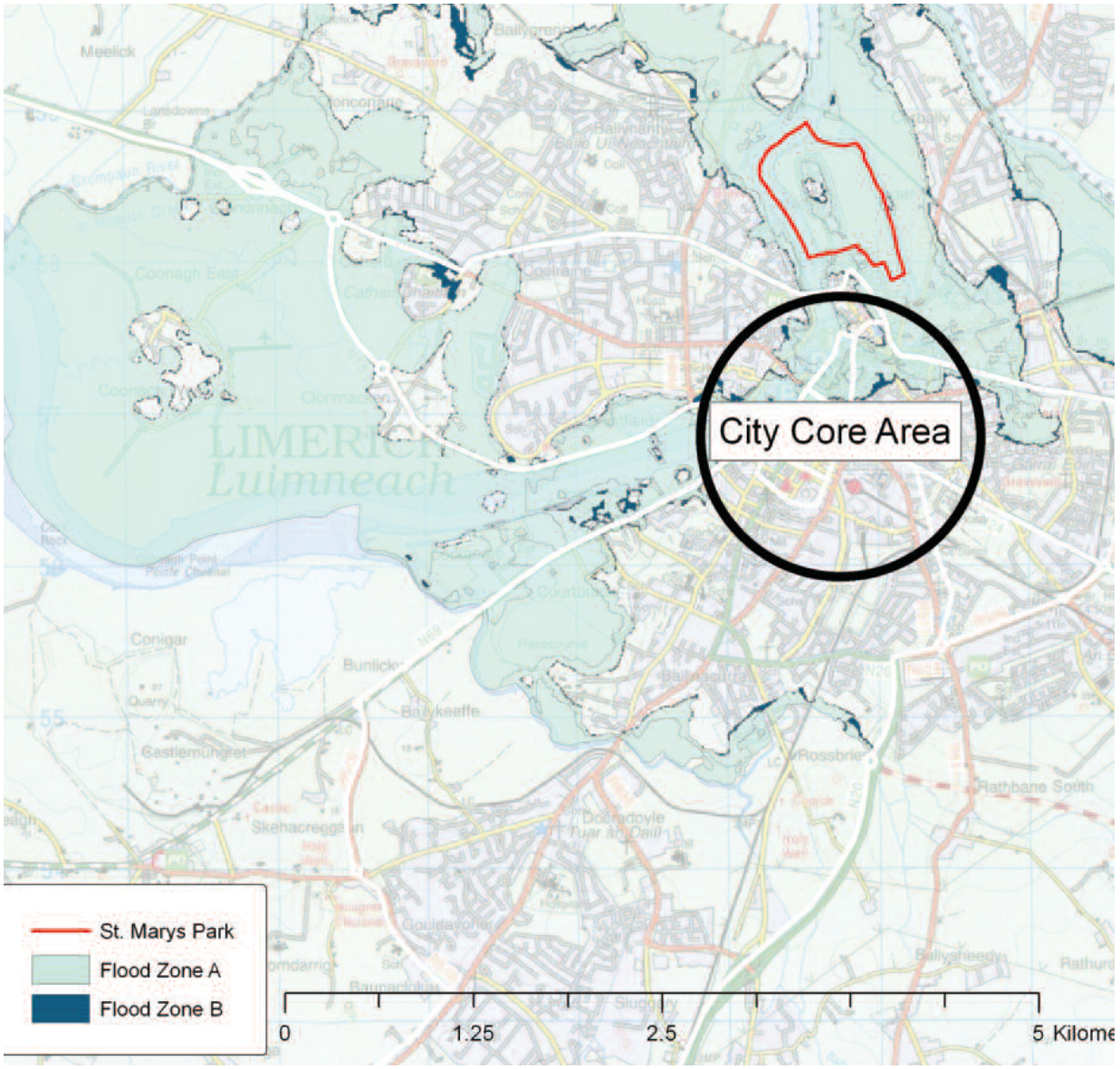

Figure 6.4
St. Mary's Park Regeneration Area

6.3 A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment

A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment
A flood risk assessment has been undertaken by Punch Consulting Engineers which demonstrates that flood risk to the development can be adequately managed and the provision of infill housing on brownfield lands will not cause unacceptable adverse impacts elsewhere.

6.4 Concluding Remarks

The foregoing assessment demonstrates that the refurbishment and infill new build works proposed in St. Mary's Park satisfy all three criteria set out in the Justification Test. The Justification Test assessment is summarised in Table 6.1. As a result it is considered that such works are in compliance with the provisions of The Planning System and Flood Risk Management -Guidelines for Planning

Criteria	Determination with Regard to Works in St. Mary's Park
The urban settlement is targeted for growth under the National Spatial Strategy, regional planning guidelines, statutory plans as defined under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act, 2000, as amended.	Yes Limerick City is a designated gateway at national and regional level and is identified to accommodate significant growth in the Limerick City Development Plan 2010 – 2016.
The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and, in particular:	The lands are appropriately zoned for residential use in the CDP and thus have already undergone and passed strategic flood risk assessment. Development on these lands is required to achieve the proper planning and sustainable development of Limerick City.
Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement;	The proposed works are essential to facilitate regeneration within the legally defined regeneration area of St. Mary's Park and to facilitate expansion of the urban settlement.
Comprises significant previously developed and/or under - utilised lands;	All works proposed comprise works on brownfield and / or under-utilised lands.
Is within or adjoining the core of an established or designated urban settlement;	The St. Mary's Park regeneration area adjoins the commercial core of Limerick City and adjoins the Special Planning Control area within King's Island where it is an objective of the CDP to grow and promote the area.
Will be essential in achieving compact and sustainable urban growth; and	The proposed works within St. Mary's Park regeneration area and particularly the proposed replacement housing on infill under-utilised and sites is essential in achieving compact and sustainable urban growth.
There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.	There are no other suitable alternative lands in areas at lower risk of flooding within or adjoining the core of the urban settlement.
A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere.	Yes, Strategic Flood Risk Assessment (SFRA) has been undertaken for the works within St. Mary's Park in accordance with The Planning System and Flood Risk Management - Guidelines for Planning Authorities Department of the Environment, Heritage and Local Government and Office of Public Works.

Table 6.1
Justification Test Summary

Authorities (Department of the Environment, Heritage and Local Government and Office of Public Works, 2009).
Of important consideration to the proposed regeneration measures in St. Mary's Park is the fact that the proposed works will still result in an overall net loss of houses in the area when compared prior to regeneration works commencing in 2008. Prior to 2008 there were some 464 no. units with St. Mary's Park. Today the figure stands at 386 no. units and when regeneration works are complete the total no. of residential units will stand at 370. This represents over a 20% reduction in the number of residential areas within an area that is subject to flood risk. Accordingly it could thus be considered that the proposed regeneration works will significantly improve the existing baseline situation as it results in an overall reduction in population residing in an area of potential flood risk.

7.0Conclusion

The LRFIP proposes a precautionary approach to flood risk management within the four regeneration areas and a preliminary assessment of flood risk indicates that all proposed new build works, are occurring on land outside of the preliminary flood risk area as identified on the flooding maps sourced from the Limerick City Development Plan with the exception of St. Mary's Park, as no alternative exists. For that reason proposed works within St. Mary's Park were subjected to a Justification Test.

Whilst most refurbishment work is proposed on land outside of the preliminary flood risk area as identified on the flooding maps sourced from the Limerick City Development Plan, there are properties within Moyross and St. Mary's Park located within the flood zone. However as the works purely comprise refurbishment works and do not comprise new build, the net effects of and to flooding to these properties poses no greater or increased risk than if the properties were not refurbished. In coming to this conclusion it is acknowledged that refurbishment of residential properties in most instances would generally not require the benefit of planning permission and therefore would not be subject to normal planning considerations (including flood risk assessment). Since such works concern existing buildings the sequential approach cannot be used to locate them in lower-risk areas and the Justification Test does not apply.

The works proposed in St. Mary's Park satisfy all three criteria set out in the Justification Test as demonstrated previously in section 6.0 and thus the proposed works within St. Mary's Park are in compliance with the provisions of The Planning System and Flood Risk Management -Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government and Office of Public Works, 2009), based on the preliminary information to hand at this point in time.

The justification test prepared is based on currently available data and will be subject to modification by emerging datasets of maps and plans forthcoming with the CFRAM as they become available.

Appendix 2A:

St Mary's Park Limerick Flood Risk Assessment

PUNCH
consulting engineers

Appendix 2A:

St Mary's Park Limerick Flood Risk Assessment

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St Mary's Park Limerick Flood Risk Assessment

1.0 Introduction

1.1 Background

PUNCH Consulting Engineers were appointed by Limerick City Council to carry out a Site Specific Flood Risk Assessment (FRA) study in St Mary's Park in compliance with the requirements of "The Planning System & Flood Management Guidelines" published by the Department of Environment in November 2009.

1.2 Nature of the Proposed Development

Saint Mary's Park is located in an area of Limerick City known as King's Island Area, see Figure 1. Kings Island is bo¬rdered by the River Shannon to the west and north and the River Abbey to the east and south. Saint Mary's park is accessed via Saint Itas Street and a pedestrian walkway on the banks of the River Shannon. This pedestrian walkway runs around the perimeter of the island on a raised embankment which also acts as a low level flood defence. It is proposed to demolish a number of houses and construct new houses on the same site.

Figure 1
Location of St Mary's Park in the Kings Island area of Limerick

2.0 The Planning System and Flood Risk Management Guidelines

In September 2008 "The Planning System and Flood Risk Management" Guidelines were published by the Department of the Environment, Heritage and Local Government in Draft format. In November 2009 the adopted version of the document was published.

The Flood Risk Management Guidelines give guidance on flood risk and development. The guidelines recommend a precautionary approach when considering flood risk management in the planning system. The core principle of the guidelines is to adopt a risk based sequential approach to managing flood risk and to avoid development in areas that are at risk. The sequential approach is based on the identification of flood zones for river and coastal flooding.

The guidelines include definitions of Flood Zones A, B and C as noted below. It should be noted that these do not take into account the presence of flood defences, as there remains risks of overtopping and breach of the defences.

Zone A
(high probability of flooding) is for lands where the probability of flooding is greatest (greater than 1% or the 1 in 100 for river flooding and 0.5% or 1 in 200 for coastal flooding).

Zone B
(moderate probability of flooding) refers to lands where the probability of flooding is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 and 0.5% or 1 in 200 for coastal flooding).

Zone C
(low probability of flooding) refers to lands where the probability of flooding is low (less than 0.1% or 1 in 1000 for both river and coastal flooding).

Once a flood zone has been identified, the guidelines set out the different types of development appropriate to each zone. Exceptions to the restriction of development due to potential flood risks are provided for through the use of the Justification Test, where the planning need and the sustainable management of flood risk to an acceptable level must be demonstrated. This recognises that there will be a need for future development in existing towns and urban centres that lie within flood risk zones, and that the avoidance of all future development in these areas would be unsustainable.
A three staged approach to undertaking a FRA is recommended:

Flood Risk Identification (Stage 1) - Identification of any issues relating to the site that will require further investigation through a Flood Risk Assessment.

Initial Flood Risk Assessment (Stage 2) - Involves establishment of the sources of flooding, the extent of the flood risk, potential impacts of the development and possible mitigation measures.

Detailed Flood Risk Assessment (Stage 3) - Assess flood risk issues in sufficient detail to provide quantitative appraisal of potential flood risk of the development, impacts of the flooding elsewhere and the effectiveness of any proposed mitigation measures.

This report addresses the requirements for both stages 1 and 2.

3.0 Flood Risk Identification

The proposed development comprises of the replacement homes on existing brownfield sites which have arisen as a result of the demolition of older units in St Mary's Park as part of the regeneration of St Mary's Park. St Mary's Park is located on Kings Island which is an island formed by the waters of the River Shannon and Abbey River. The Abbey River is actually a split of the River Shannon, see Figure 1. Both the River Shannon and the Abbey River are tidal in the vicinity of St Mary's Park. Therefore both fluvial and coastal flood risk will be considered.

3.1 Fluvial Flooding

3.1.1Hydrology of the River Shannon

The River Shannon is both the longest and largest river in Ireland. The River Shannon rises in the Shannon pot in County Cavan and generally flows in a south-westerly direction towards the Shannon Estuary where it enters the Atlantic Ocean. The catchment upstream of Limerick is greater than 10,000 km2. There are three major lakes, Lough Allen, Lough Ree and Lough Derg on the Shannon. There is a very limited fall between Lough Allen and Lough Derg (circa 13 m over 200 km). The presence of the lakes and the small fall between the outlet of Lough Derg and inlet of Lough Allen has the effect of attenuating flows in the catchment. The lag time between runoff from rainfall in the middle and upper sections of the Shannon catchment and increased flows in Limerick may be of the order of days.
Downstream of Lough Derg a hydroelectric scheme was built in the 1920's. A weir at Parteen splits the flow of the River Shannon into two separate flows. One flow continues in the natural channel via Castleconnell and the second flow is diverted down a man made head race to Ardnacrusha generating station. The flow passes through the power station and rejoins the natural channel just upstream of Limerick.

3.1.2 Fluvial flood records

There have been a number of instances of flooding in Limerick City centre, including parts of Kings Island in the past. The most recent of these events occurred in 1999, 2002 and 2009. The OPW maintains a register of flood reports (see Appendix C) and as part of this study this website (www.floodmaps.ie) was reviewed for all relevant reports. Appendix F contains reports on the recent significant floods that hit Limerick City.

It must be noted that these reports were downloaded from the OPWs register of flood reports, and are only intended to be used as evidence of past flood events in Limerick City. The authors of these reports and the handwritten comments are unknown. These comments were on the reports downloaded from www.floodmaps.ie and were not modified by PUNCH Consulting Engineers. A number of the reports include recommendations for flood alleviation. The rational or design criteria taken in designing these measures is not known nor is it known if any of these measures were implemented. The maximum observed water level was in December 1999 where levels were reported to be of the order of 4.4 m in the Abbey River. However, it is possible that these water levels were artificially elevated by the construction of berms on the Abbey River as part of the Limerick main drainage project. See Appendix E for details of the December 1999 floods. These floods arose from a period of prolonged rainfall, a spring tide and a storm surge which added 1.3 m to the tide. It is noted that flooding was reported on Kings Island near St Mary's Park in February 2002 (Appendix E).

3.2Coastal Flooding

3.2.1 Causes

Coastal flooding arises from sea levels which are higher than normal and result in sea water overflowing onto the land. Coastal flooding is influenced by the following three factors which often work in combination, high tide level, storm surges and wave action.

3.2.2 Tides

Astronomical tides vary over time and are predictable. The highest astronomical tides occur in spring tides every two weeks around the time of full and new moons when the gravitational pull of the moon and sun are aligned. This gravitational pull is amplified around the equinox. As these tides occur relatively frequently they do not result in flooding. However, these predicted tide levels often differ from observed tide levels due to weather conditions.

3.2.3 Storm surge

A storm surge is a rise in sea level caused by winds associated with an area of low atmospheric pressure (depression). This area of elevated water can then be pushed towards the coast by the winds of a depression or storm. Surges occur relatively frequently of the coast off Ireland however, it is only when the arrival of these surges at the coast coincides with a high tide that storm surges will result in coastal flooding. Once of the most recent significant events happened in February 2002 when a large surge generated by an area of low pressure to the northwest of Ireland coincided with one of the highest spring tides of the year. This resulted in significant flooding in many low lying coastal areas around Ireland.

3.2.4 Wave Action

A combination of storm surges and high tides may result in the flooding of low lying areas near the coast. While this flood water will result in damage in these areas the wave action of the flood waters may cause significantly more damage to buildings and infrastructure in flooded areas due to the energy of the waves. The energy of waves is dependant on local topography, exposure, direction and the wind speed generating the waves. Wave action may also result in the overtopping of flood defences. However, as the proposed development is located so far inshore wave action is not considered relevant at this site.

3.2.5 Coastal Flooding Risk

Given the proximity of the site to tidal sections of the Abbey and Shannon Rivers coastal flooding must be considered. The highest predicted astronomical tide in the Shannon Estuary is 5.7 m Chart Datum (2.67 m Malin). It is clear that St Mary's Park does not flood during these high astronomical tides. However, predicted tide levels often differ from observed tide levels due to weather conditions particularly storm surges.

3.2.6 Historic Flood levels

Limerick Dock Tide Gauge

Shannon Foynes Port Company has operated a tide gauge in Limerick dock for over 60 years. A study of the tidal records by Anthony Cawley of Hydro Environmental carried out as part of Flood Risk Assessment in the Clonmacken area of Limerick in 2008 noted that highest recorded flood level over the past 60 years was 4.2 m (note all levels noted in this study are to Malin datum unless otherwise stated). This flood level occurred in September 1961 and was associated with Hurricane Debbi, see Appendix B for details on Hurricane Debbie. The flood levels were driven solely by a tidal storm surge event. On the 1st February 2002 a storm surge event produced a recorded high tide level of 4.19 m at Limerick Docks which was very close to the 1961 level. This storm surge also affected the east of the country and resulted in many low lying areas of Ireland flooding. During the December 1999 flood event (24th and 25th December) a flood level of 4.2 m was reported. This however, was attributed to very large fluvial flows in the River Shannon that combined with high astronomical spring tides.

Balls Bridge Water Level Recorder

The OPW operate a water level recorder at Balls Bridge on the Abbey River. This hydrometric water level observation station (25061) is part of the OPW's river monitoring programme see www.opw.ie/hydro for further details. The records from this station show that the highest observed water level occurred in 1961 at 4.32 m. Other high water levels of note are 4.06 on the 5th of January 1991 and 3.84 m 2nd of January 1999. Unfortunately the gauge was not operational during the February 2002 storm surge due to construction works on the park canal.

Year	Water Level (m)	Reading on gauge (m)	Year	Water) Level (m)	Reading on gauge (m)
1957	3.31	4.16	1984	3.37	4.33
1958	3.60	4.45	1985	3.44	4.4
1959	3.86	4.71	1986	3.82	4.78
1960	3.71	4.67	1987	3.84	4.8
1961	4.32	5.28	1988	3.65	4.61
1962	3.41	4.37	1989	3.94	4.9
1963	3.68	4.64	1990	4.06	5.02
1964	3.95	4.91	1991	3.74	4.7
1965	3.70	4.66	1992	3.96	4.92
1966	3.56	4.52	1993	3.88	4.84
1967	3.62	4.58	1994	3.92	4.88
1968	3.79	4.75	1995	3.60	4.56
1969	3.56	4.52	1996	3.24	4.2
1970		-	1997	3.74	4.7
1971	3.49	4.45	1998	3.84	4.8
1972	3.56	4.52	1999	3.40	4.36
1973	3.83	4.79	2000	3.34	4.3
1974	3.91	4.87	2001		-
1975	3.94	4.9	2002	3.86	3.82
1976	3.67	4.63	2003	3.53	3.48
1977	3.90	4.85	2004	3.68	3.63
1978	3.44	4.4	2005	3.76	3.72
1979	3.64	4.6	2006	3.70	3.67
1980	3.66	4.62	2007	3.78	3.74
1981	3.86	4.82	2008	3.50	3.46
1982	4.00	4.96	2009	3.66	3.62
1983	3.65	4.61	2010	3.60	3.56

Table 1
Water level records at Balls Bridge

Note these are the highest recorded water levels or estimated flows in each available hydrometric year of record. A hydrometric year runs from 1st October in the given year to the 30th September the following year, i.e., the hydrometric year 2000 runs from 1st October 2000 to 30th September 2001.

3.2.7 Estimated Future Flood Levels

A number of studies have been carried out into future flood levels that may be experienced in the Shannon estuary. However, all these studies are hampered by the lack of data, particularly water level records. While a tide gauge has been in place in Limerick dock for a number of decades there is some confusion as to the datum it has been operating at during the first number of years of operation. This in combination with the errors associated with estimating flood levels of events with long return periods from short data sets has led to difficulties in estimating the 1 in 200 year flood levels in Limerick. The analysis carried out by Cawley (2008) suggests that the 1 in 200 year flood level is greater than 4.5 m. Due to the uncertainty associated arising from the data sets used in the estimation of this level, this figure is ± 200 mm. This excludes the future effects of climate change.

3.2.8 Irish Coastal Protection Strategy Study

The OPW recently commissioned RPS to carry out a study to Assess Coastal Flooding and Erosion Extents in Ireland, known as the Irish Coastal Protection Strategy Study (ICPSS). This study has produced predictive flood maps and levels for flood events with various probabilities of occurrence (e.g., the 1% AEP event). While a compressive review of this report is not considered necessary for this Flood Risk Assessment the interested Reader is referred to the OPW and the ICPSS for further information, it is sufficient to note that a total 26 nodes were analysed starting at the Shannon Estuary and moving up along the estuary towards Limerick City. The predicted water levels at these nodes are based on analysis and modelling. The node closest to Limerick City is node 26 and as such was deemed the most relevant to this study. Appendix D contains the locations of these nodes and the predicted water levels for the various flood events. From this we note that the ICPSS predicts during an event with a 0.5% AEP (1: 200 year event) the water level in the Shannon Estuary at node 26 will be 4.59 m. For the more extreme 1:1000 year event (0.1% AEP), water levels of 5.0 m are predicted at node 26 m. When the water level of all the nodes is studied, it can be clearly seen that the predicted water is higher moving from the estuary towards Limerick City. Given that Saint Marys Park/Kings Island is further upstream than node 26 it is assumed that water levels will higher there than at node 26. It is difficult to establish how much higher the water level will be in the vicinity of Kings Island, however the OPW estimate that the water level will be 0.4 to 0.5 m higher that the water level at node 26. For the purposes of this study we have assumed that water levels of 5.0 m for a 1:200 year event and 5.5 m for a 1:1000 year event in the vicinity of Kings Island. This indicates that any lands below 5.0 m can be considered to be in Flood Zone A and anything above 5.5 m can be considered to be in Flood Zone C. Lands between 5.0 and 5.5 m are identified as Flood Zone B.

3.3 Flood Risk to the Site of the Proposed Developments

While the previous sections discuss the flood risk to the developments from both fluvial and coastal flooding it can be seen that the predominant flood threat arises from coastal flooding.

While fluvial flooding has resulted in flooding in and around Limerick City in the past, higher flood levels have been noted in the Limerick area from storm surges. It is unlikely that a significant surge would coincide with an extreme fluvial flood. A storm surge will be associated with low pressure system in the Atlantic. Given the large size of the Shannon catchment there will be a large lag between rainfall associated with the low pressure system driving the surge, surface runoff and increased flows in the River Shannon in Limerick. Thus we argue that a tidal storm surge is the dominant critical flooding mechanism for the Limerick City area including St Mary's Park.

3.4 Walkover Survey

On 1st of July 2013 PUNCH Consulting Engineers visited the site to establish any potential sources of flooding, likely routes of flood waters and the sites key features. Appendix E contains pictures from the site visit The following was established on site:

- St Mary's Park is adjacent to the River Shannon.
- The site is defended by an embankment.
- High tide was expected 1.5 hours after the site visit.
- The current land use is a housing estate.
- No standing water was observed on the site and no evidence of flood waters around the site could be seen.

3.5 Estimates of Flood Zone and Flood Risk

There is no evidence of St Mary's Park ever flooding. This however, does not mean that there is no flood threat to the site. Indicative flood maps (Appendix A) place much of Limerick City in Flood Zone A (at risk in a 1 in 200 year coastal flooding event). These maps are likely to be refined in the future as more detailed data becomes available. However, given the expected water levels in a 1 in 200 year event it is likely that St Mary's Park will still remain in Flood Zone A. This in combination with the fact that we are following the precautionary principle we conclude that the proposed site is in Flood Zone A.

3.5.1 LiDAR Data

In the past number of years LiDAR has been increasingly used in many aspects of flood analysis due to its increasing availability, decrease in cost and the increased computational power of computers. It is a remote sensing technology that uses laser scanning from fixed wing aircraft to gather height or elevation data. Data points are gathered by emitting a light pulse from the aircraft to the ground, the time taken for the light to bounce back from the ground to a sensor in the aircraft is recorded. This data is used to estimate the distance to the ground from the aircraft and by combining this data with the elevation of the aircraft, the elevation of the ground at this point can be estimated.

3.5.2 Analysis of LiDAR data

For the purposes of this project Punch Consulting Engineers were supplied with 2 m (0.25 m accuracy) LiDAR data of the Saint Marys Park area. The data used was a bare earth model i.e. the effects of houses, trees etc. were removed. This data was analysed in the Vertical Mapper v 3.7 extension of MapInfo 12.01 (© 2013 Pitney Bowes Software Inc). A triangular mesh was created of the study area and from this, and the 5.0 and 5.5 m contours which correspond to the estimates of the 1:200 and 1:1,000 year events were then generated.

3.5.3 Flood Zone Estimate

Using the LiDAR data Punch Consulting Engineers were able to identify all areas above 5.5 m which are assumed to be in Flood Zone C. Area with a level lower than 5.0 m are considered to be in Flood Zone A, with areas between 5.0 and 5.5 identified as Flood Zone B, see section 3.2.8. Figure 2 below shows the extents of Flood Zone A, B and C.

Figure 2
Flood A, B and C

4.0 Flood Risk Assessment

4.1Sources of Flooding

When carrying out a flood risk assessment one should consider all the potential flood risks and sources of flood water at the site. In general the relevant flood sources are:

- Fluvial
  Fluvial Flooding is the result of a river exceeding its capacity and excess water spilling out onto the adjacent floodplain. A flood risk from the River Shannon in the vicinity of St Mary's Park does exist from fluvial sources, however it is much lower that the coastal risk.

- Pluvial
  Pluvial flooding is the result of rainfall-generated overland flows which arise before run-off can enter any watercourse or sewer. It is usually associated with high intensity rainfall. Flood risk from pluvial sources is not thought to be significant at this site due to the topography of the site.

- Coastal
  Coastal flooding is the result of sea levels which are higher than normal and result in sea water overflowing onto the land. Given the proximity of St Mary's Park to the tidal reaches of the River Shannon and the known coastal flooding issues around Limerick, it is considered that there is a coastal flood risk at this site.

4.2 Flood Zone

With reference to Section 3.5 above, it is assumed that St Mary's Park is in Flood Zone A. Flood Zone A is defined in the Planning System and Flood Risk Management Guidelines, where the probability of flooding is highest, greater than 1% or 1 in 100 for river flooding and 1 in 200 for coastal flooding.

4.3 Vulnerability and Finished Floor Levels

Table 3.1 of the Planning System and Flood Risk Management Guidelines for Planning Authorities gives a detailed classification of vulnerability of different types of development. Residential houses are classed as highly vulnerable developments and Flood Zone A or Flood Zone B are not deemed not suitable unless they pass the justification test (refer to Table 3.2 of the Guidelines).

4.3.1 Potential Impact of Development on Flooding Elsewhere

The proposed works will have a negligible impact on causing flooding elsewhere. If the proposed works were located in an area identified as a flood zone which is at risk from fluvial flooding then loss of flood storage may be an issue. However, as this area is at risk of coast flooding loss of storage is not an issue as the volume of water in the sea may be considered infinite. The area of the Shannon Estuary is circa 500 km2. A spring tide with a storm surge is likely to raise the water levels in the estuary by 6 to 7 meters in a flowing tide. Based on these assumptions 1.625*1012 m3 of water will surge up the Shannon Estuary in under 6 hours. The areas of the estuary that will be covered by this flood will be dependant entirely on topography and will not be influenced by the addition or removal of storage such as the demolition, extension or construction of new houses in the St Mary's Park area of Limerick City.
Consideration should also be given to the less severe risk associated with fluvial flooding. The guidelines indicate that if there is a risk from fluvial flooding compensatory storage should be provided to mitigate any loss of flood storage. However, in this instance the subject lands are protected from fluvial flooding by virtue of the flood embankments and hence the lands no longer provide a flood storage function. The Guidelines acknowledge that flood defences can be breached or overtopped, therefore compensatory storage would normally be provided to cater for a overtopping/ breach event. Given that the project is will essentially replace one house with another on the same site, any loss of storage associated with a breach would be negligible.

4.3.2 Emergency Response Planning

As part of the current proposal of the demolition and replacement of existing houses it will also necessary to put in place an emergency response plan. The critical elements of this plan will be a flood warning system and an evacuation plan to move people from St Mary's Park to an area of lower flood risk. The residents of St Mary's Park must be made aware of the flood risk to the area and the details of the evacuation plan. This evacuation plan will require coordination between Local Authorities, Civil Defence, Fire and Rescue and An Garda Siochána. Provision of a flood escape route from St Mary's Park is also recommended. Given that there is a walkway all around St Mary's Park on the existing flood embankments, which are higher than St Mary's Park, we recommend using the embankments as a publicly accessible escape route.

4.3.3 Climate Change

Advice on the expected impacts of climate change and the allowances to be provided for future flood risk management in Ireland is given in the "OPW Assessment of Potential Future Scenarios, Flood Risk Management Draft Guidance", 2009. Two climate change scenarios are considered. These are the Mid-Range Future Scenario (MRFS) and the High-End Future Scenario (HEFS). The MRFS is intended to represent a "likely" future scenario based on the wide range of future predictions available. The HEFS represents a more "extreme" future scenario at the upper boundaries of future projections. Based on these two scenarios the OPW recommended allowances for climate change are given in Table 2.

Using present guidelines it is estimated that climate change will likely add 500 mm to sea levels. Land movement in the southern part of the country must also be considered and best estimates suggest the rate of land movement is 0.5 mm per year. If a design life of 100 years is considered then a reduction in land levels of 50 mm must be accounted for. However, we suggest that land movement and sea level rise is more relevant for development in smaller towns and villages located on the coast. While the nature and rate of sea level rise is very uncertain, should the full effects of sea level rise be

experienced, a flood defence system that would protect Limerick City and its environs will be required. Therefore we argue that should climate change result in major sea level rise Limerick City will require a flood defence system that would protect the city and by extension St Marys Park and as such we do not deem in necessary to include for climate change when assessing the flood risk to St Marys Park. We do note that the freeboard allowed will provide some protection to climate change (see section 4.3.4).

4.3.4 Finished Floor Level

The Limerick City development Plan 2010-2016 states that "with regard to flood protection and the most up to date flood reports which indicate that a minimum floor level of 900 mm above the maximum recorded High Tide Level for the area in question". As the highest recorded tidal flood level at Limerick docks is 4.2 m this would indicate that a finished floor level of 5.1 m is required. The Planning System and Flood Risk Management guidelines for planning authorities recommend that finished floor levels are placed above the 200 year flood level with an appropriate freeboard. We deem that 250 mm would be an appropriate freeboard. Therefore taking this into consideration we estimate that the finished floor levels of new dwellings should be placed at or above 5.75 m. This is estimated from; 250 mm freeboard and a 1000 year flood level of 5.5 m (see section 3.2.8). As the requirements of the guidelines are more onerous than the requirements of the Limerick City Development and the guidelines recommend adopting a conservative approach we recommend placing the finished floor level of the proposed development at 5.75 m. It must be noted that this is higher to the level of 5.2 m used for the design of the Limerick Tunnel (http://construction.limericktunnel.com/Engineering Information.html).

	MRFS	HEFS
Extreme Rainfall Depth's	+20%	+30%
Flood Flows	+20%	+30%
Main Sea Level Rise	+500mm	+1000mm
Land Movement	-0.5mm / year*	-0.5mm / year*
Urbanisation	No General Allowance Review on Case by Case basis	No General Allowance Review on Case by Case basis
Forestation	-1/6 Tp**	-1/3 Tp** +10% SPR***

Table 2
Recommended allowances for Climate Change (taken from the OPW - Assessment of Potential Future Scenarios for Flood Risk Management)

5.0 Conclusion

Given the location of the site of the proposed developments and their proximity to a tidal section of the River Shannon, a Flood Risk Assessment was required. This report was written with The Planning Systems and Flood Risk Management Guidelines for Planning Authorities in mind and in general it follows the requirements of a stage one and two Flood Risk Assessment. A review of historical floods and indicative flood maps suggests that St Mary's Park is in Flood Zone A (at risk from coastal flooding in a 1 in 200 year event).

Table 3.1 of the Planning System and Flood Risk Management Guidelines for Planning Authorities gives a detailed classification of vulnerability of different types of development. Residential houses are classed as highly vulnerable development and Flood Zone A or Flood Zone B are not deemed not suitable unless they pass the justification test (refer to Table 3.2 of the Guidelines).

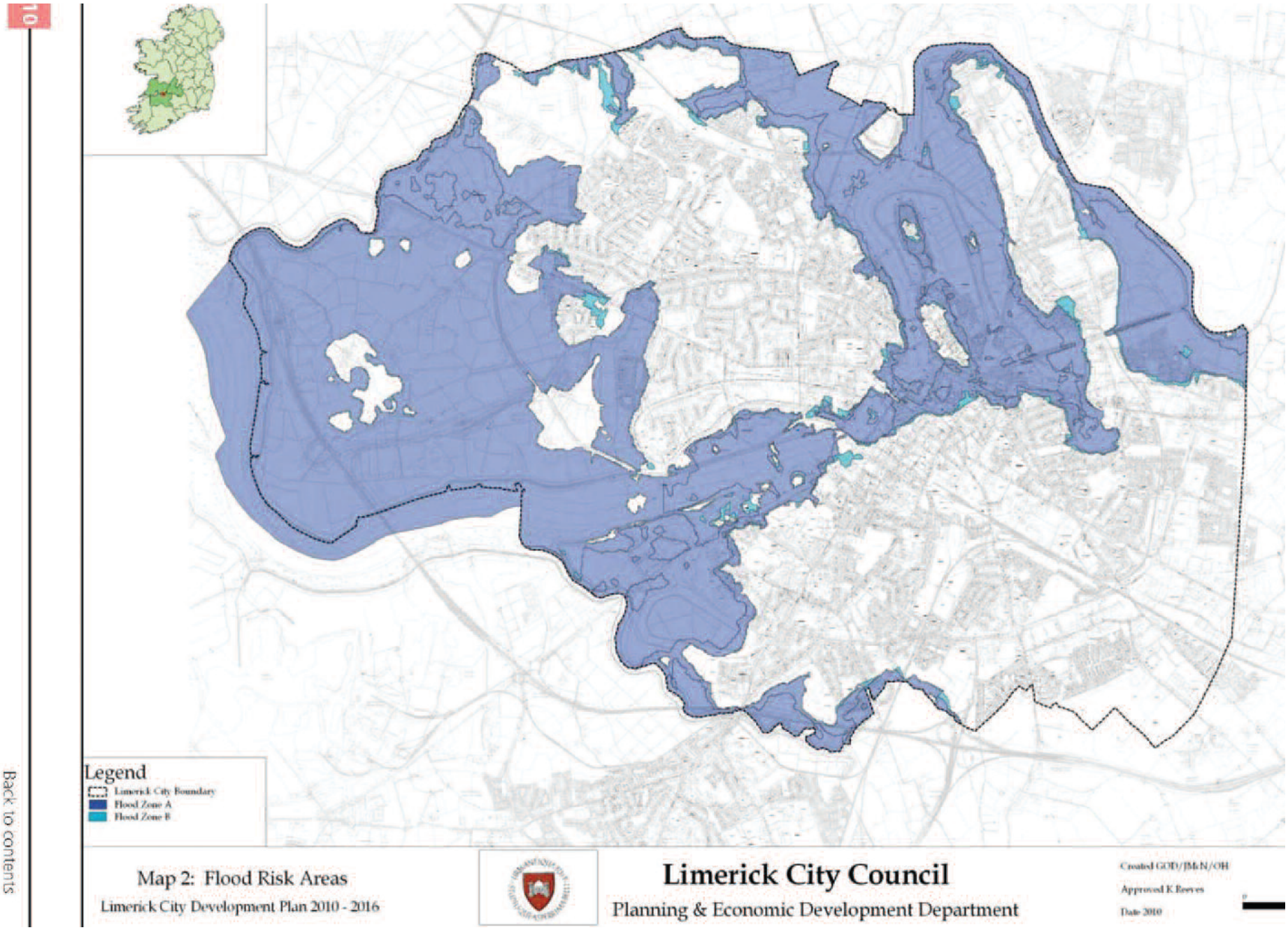
The determination of the exact flood level for a 1 in 200 or 1:1000 year coastal flood event at the site of the proposed is considered to be an extremely complex process. Accurate determination of future flood levels is hampered by limited data sets. This study reviewed a number of studies of water levels in the Shannon Estuary and following this review it was decided to adopt the recommendations from the Irish Coastal Protection Strategy Study. Following an analysis of available data this study noted that the 1:200 and 1:1,000 year flood level is likely to be 4.59 m and 5 m respectively at a point downstream of Limerick City. It was assumed that water levels would likely be 0.4-0.5 m higher in the vicinity of the proposed development therefore it was concluded that water levels of 5.0 m for a 1:200 year event and 5.5 m for a 1:1000 year event could be expected in the vicinity of St Marys Park/Kings Island. This indicates that any lands below 5.0 m can be considered to be in Flood Zone A and anything above 5.5 can be considered to be in Flood Zone C. Lands between 5.0 and 5.5 m are identified as Flood Zone B.

The Planning System and Flood Risk Management Guidelines recommend that finished floor levels are placed above the flood level with an allowance for climate change and appropriate freeboard. We argue that if the full effects of climate change are experienced it will be necessary to construct a flood defence mechanism for Limerick City thereby insulating St Marys Park from the effects of climate change. Therefore taking this into consideration we estimate that the finished floor levels should be placed at or above 5.75 m. This was estimated from 250 mm freeboard and a 1 in 1000 year flood level of 5.5 m.

As part of the current proposal it will also necessary to put in place an emergency response plan. The critical elements of this plan will be a flood warning system and an evacuation plan to move people from St Mary's Park to an area of lower flood risk. The residents of St Mary's Park must be made aware of the flood risk to the area and the details of the evacuation plan. This evacuation plan will require coordination between Local Authorities, Civil Defence, Fire and Rescue and An Garda Siochána.

Appendix A:

Flood risk maps (taken from Limerick City Development Plan 2010-2016)



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Appendix B:

Hurricane Debbie

'HURRICANE DEBBIE' WINDS IN SEPTEMBER 1961
STILL THE STRONGEST ON RECORD IN PLACES

Ireland was hit by winds gusting over 110m.p.h. as the centre of the former hurricane *Debbie* passed close to the west coast during the morning of Saturday, September 16th 1961. At a number of stations the winds recorded that day were the highest measured either before or since, while the gust of 98 knots *(113m.p.h.)* at Malin Head is the joint highest gust ever recorded in Ireland -the same value was recorded at Foynes, Co. Limerick on January 18th 1945, before the instrument pen went off the chart. While true hurricanes are technically not found at latitudes as high as Ireland, Debbie retained many hurricane characteristics when it arrived off the southwest coast. Damage to property was extensive over the western half of the country and 11 deaths were attributed to the storm.

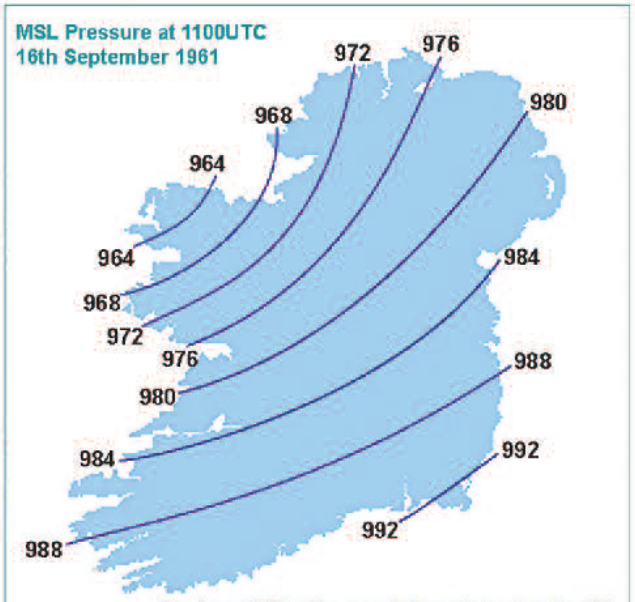
Debbie was unusual in developing into a hurricane so far east in the Atlantic. It reached category 1 status on the Saffir-Simpson scale on the 6th, just off the Cape Verde Islands *(see chart below)* where it caused a plane crash and the deaths of 60 people. After reaching category 3 status in mid-Atlantic on the 11th, with mean windspeeds of over 100 knots *(120m.p.h.)* it turned northeastwards towards Ireland and lost some of its intensity over the cooler waters of the North Atlantic. *Debbie* moved on to cause severe gales over Scotland, while the remains of the storm could be traced as far east as Russia towards the end of the month.

Highest windspeeds (knots) measured on 16th September 1961

Station	Max Gust	Max 10 min mean wind
Belmullet	80	57
Birr	81	39
Claremorris	91	60*
Clones	87*	50
Dublin Airport	64	34
Kilkenny	65	40
Malin Head	98*	66
Mullingar	79*	45*
Roche's Point	71	52
Rosslare	72	47
Shannon Airport	93*	60*
Valentia Observatory	88*	58

** denotes highest value on record* — *1 knot = 1.15m.p.h.*

Above
The track taken by Hurricane Debbie from its formation off the west coast of Africa. Hurricane categories on the Saffir-Simpson scale are as follows:
Category 1- Mean windspeeds between 64 and 82 knots (74 and 95m.p.h.)
Category 2- 83 to 96 knots (96 to 110m.p.h.)
Category 3- 97 to 113 knots (111 to 130m.p.h.)



The lowest MSL value recorded over Ireland on the 16th was 961.4hPa at Belmullet; this remains the lowest September pressure value ever measured at the station.

Appendix C:

OPW Flood Maps

OPW *National Flood Hazard Mapping*

Summary Local Area Report

This Flood Report summarises all flood events within 2.5 kilometres of the map centre.

The map centre is in:

County: Limerick

NGR: R 577 577

This Flood Report has been downloaded from the Web site www.floodmaps.ie. The users should take account of the restrictions and limitations relating to the content and use of this Web site that are explained in the Disclaimer box when entering the site. It is a condition of use of the Web site that you accept the User Declaration and the Disclaimer.

Map Scale 1:24,852

Map Legend
Flood Points
Multiple / Recurring Flood Points
Areas Flooded
Hydrometric Stations
Rivers
Lakes
River Catchment Areas
Land Commission *
Drainage Districts *
Benefiting Lands *

* Important: These maps do not indicate flood hazard or flood extent. Thier purpose and scope is explained in the Glossary.

59 Results

1. Shannon Banks 23/11/2009 — Start Date: 23/Nov/2009
County: Clare — Flood Quality Code 2
Additional Information: Reports (1) More Mapped Information

2. Limerick City Area Nov 2009 — Start Date: 19/Nov/2009
County: — Flood Quality Code 3
Additional Information: Reports (2) More Mapped Information

3. Shannon Lower Feb 1990 — Start Date: 01/Feb/1990
County: Clare, Limerick, Tipperary — Flood Quality Code 2
Additional Information: Photos (1) Reports (2) Press Archive (15) More Mapped Information

4. Shannon December 1954 — Start Date: 01/Dec/1954
County: Clare, Galway, Leitrim, Limerick, Longford, Offaly, Roscommon, Tipperary, Westmeath — Flood Quality Code 1
Additional Information: Reports (4) Press Archive (18) More Mapped Information

5. Shannon Dock Road Limerick Dec 1999 — Start Date: 25/Dec/1999
County: Limerick — Flood Quality Code 2
Additional Information: Reports (5) Press Archive (1) More Mapped Information

6. Clare St Limerick Dec 1999 — Start Date: 25/Dec/1999
County: Limerick — Flood Quality Code:2
Additional Information: Reports (3) Press Archive (1) More Mapped Information

7. Shannon Westfields Limerick Dec 1999 — Start Date: 25/Dec/1999
County: Limerick — Flood Quality Code:2
Additional Information: Reports (3) Press Archive (2) More Mapped Information

8. Corrib Drive Limerick Dec 1999 — Start Date: 25/Dec/1999
County: Limerick — Flood Quality Code:2
Additional Information: Reports (3) Press Archive (1) More Mapped Information

9. Ballysimon Limerick Dec 1999 — Start Date: 25/Dec/1999
County: Limerick — Flood Quality Code:2
Additional Information: Reports (3) Press Archive (2) More Mapped Information

10. Shannon Ballynanty Killeely Limerick Dec 1999 — Start Date: 25/Dec/1999
County: Clare, Limerick — Flood Quality Code:3
Additional Information: Reports (2) Press Archive (1) More Mapped Information

11. Shannon Fields Limerick Dec 1999 — Start Date: 25/Dec/1999
County: Clare, Limerick — Flood Quality Code:3
Additional Information: Reports (2) Press Archive (1) More Mapped Information

12. Glenagross Limerick Dec 1999 — Start Date: 25/Dec/1999
County: Limerick — Flood Quality Code:3
Additional Information: Reports (2) Press Archive (1) More Mapped Information

13. Healy's Field O'Briens Pk Limerick Dec 1999 — Start Date: 25/Dec/1999
County: Limerick — Flood Quality Code:3
Additional Information: Reports (3) Press Archive (1) More Mapped Information

14. Groody Dec 1999 — Start Date: 25/Dec/1999
County: Limerick — Flood Quality Code:3
Additional Information: Reports (3) Press Archive (1) More Mapped Information

15. Shannon Athlunkard St Limerick Dec 1999 — Start Date: 25/Dec/1999
County: Limerick — Flood Quality Code:3
Additional Information: Reports (10) Press Archive (1) More Mapped Information

16. Corbally St Mary's Pk Limerick Dec 1999 — Start Date: 25/Dec/1999
County: Limerick — Flood Quality Code:3
Additional Information: Reports (9) Press Archive (2) More Mapped Information

17. Clancy's Strand Harry's Mall Limerick Dec 1999 — Start Date: 25/Dec/1999
County: Limerick — Flood Quality Code:3
Additional Information: Photos (2) Reports (17) Press Archive (3) More Mapped Information

18. Corbally R463 Limerick Dec 1999 — Start Date: 25/Dec/1999
County: Limerick — Flood Quality Code:2
Additional Information: Reports (5) Press Archive (1) More Mapped Information

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19. Kilmurry Road Limerick Dec 1999 — Start Date: 25/Dec/1999
County: Limerick — Flood Quality Code: 2
Additional Information: Reports (2) Press Archive (1) More Mapped Information

20. St Patrick's Road Well Field Limerick Dec 1999 — Start Date: 25/Dec/1999
County: Limerick — Flood Quality Code: 2
Additional Information: Reports (2) Press Archive (1) More Mapped Information

21. Clancy O'Callaghan's Strand Limerick Feb 1987 — Start Date: 10/Feb/1987
County: Limerick — Flood Quality Code: 2
Additional Information: Photos (1) Reports (3) More Mapped Information

22. Clancy's O'Callaghan's Strand Limerick Jan 1995 — Start Date: 17/Jan/1995
County: Limerick — Flood Quality Code: 3
Additional Information: Reports (1) Press Archive (1) More Mapped Information

23. Custom House Quay Sarsfield St Limerick Feb 2002 — Start Date: 11/Feb/2002
County: — Flood Quality Code: 2
Additional Information: Reports (2) More Mapped Information

24. Shannon Condell Road Limerick Feb 2002 — Start Date: 11/Feb/2002
County: — Flood Quality Code: 3
Additional Information: Reports (3) More Mapped Information

25. Athlunkard Street Limerick Feb 2001 — Start Date: 04/Feb/2001
County: Limerick — Flood Quality Code: 4
Additional Information: Reports (2) More Mapped Information

26. Harry's Mall Limerick Jan 1995 — Start Date: 17/Jan/1995
County: — Flood Quality Code: 3
Additional Information: Reports (2) More Mapped Information

27. Limerick Condell Road Feb 1990 — Start Date: 01/Feb/1990
County: — Flood Quality Code: 3
Additional Information: Photos (2) More Mapped Information

28. Clancy's Strand Limerick Feb 2002 — Start Date: 11/Feb/2002
County: — Flood Quality Code: 2
Additional Information: Photos (2) Reports (7) More Mapped Information

29. OCallaghans Strand Limerick Feb 2002 — Start Date: 11/Feb/2002
County: Limerick — Flood Quality Code: 3
Additional Information: Reports (2) More Mapped Information

30. Shannon Limerick Dec 2006 — Start Date: 01/Dec/2006
County: Clare, Limerick — Flood Quality Code: 2
Additional Information: Photos (1) Reports (1) More Mapped Information

31. Corbally Limerick Feb 2002 — Start Date: 27/Feb/2002
County: Limerick — Flood Quality Code: 3
Additional Information: Reports (3) More Mapped Information

32. Limerick Feb 2002 - Killely — Start Date: 11/Feb/2002

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County: Limerick — Flood Quality Code: 2
Additional Information: Reports (1) More Mapped Information

33. St Mary's Park Limerick Feb 2002 — Start Date: 11/Feb/2002
County: Limerick — Flood Quality Code: 3
Additional Information: Reports (1) More Mapped Information

34. Shannon Harrys Mall Limerick Feb 2002 — Start Date: 11/Feb/2002
County: — Flood Quality Code: 3
Additional Information: Reports (2) More Mapped Information

35. Clancy's Strand Limerick 17/10/2001 — Start Date: 17/Oct/2001
County: — Flood Quality Code: 2
Additional Information: Photos (1) More Mapped Information

36. Shannon Long Pavement Parteen Limerick Dec 2000 — Start Date: 01/Dec/2000
County: Limerick — Flood Quality Code: 4
Additional Information: Reports (1) More Mapped Information

37. Harry's Mall Limerick Feb 2000 — Start Date: 08/Feb/2000
County: — Flood Quality Code: 2
Additional Information: Photos (1) More Mapped Information

38. Abbey River Athlunkard St Limerick Jan 00 — Start Date: 01/Jan/2000
County: Limerick — Flood Quality Code: 2
Additional Information: Photos (2) Reports (1) More Mapped Information

39. Verdant Place Limerick Dec 1999 — Start Date: 25/Dec/1999
County: Limerick — Flood Quality Code: 2
Additional Information: Reports (3) More Mapped Information

40. Shannon Quinspool, Parteen Clare Dec 1999 — Start Date: 24/Dec/1999
County: Clare — Flood Quality Code: 3
Additional Information: Reports (1) More Mapped Information

41. Lee Estate Island road Limerick Feb 1997 — Start Date: 10/Feb/1997
County: Limerick — Flood Quality Code: 2
Additional Information: Reports (1) More Mapped Information

42. Harry's Mall Limerick Feb 1997 — Start Date: 10/Feb/1997
County: — Flood Quality Code: 2
Additional Information: Photos (1) Reports (4) More Mapped Information

43. Rebogo Limerick Feb 1997 — Start Date: 10/Feb/1997
County: Limerick — Flood Quality Code: 3
Additional Information: Reports (3) More Mapped Information

44. Meacowbrook Limerick Feb 1997 — Start Date: 10/Feb/1997
County: Limerick — Flood Quality Code: 3
Additional Information: Reports (3) More Mapped Information

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45. Condel Road Limerick Feb 1997 — Start Date: 10/Feb/1997
County: — Flood Quality Code: 3
Additional Information: Reports (2) More Mapped Information

46. Dock Road Bishops Quay Limerick Feb 1997 — Start Date: 10/Feb/1997
County: Limerick — Flood Quality Code: 3
Additional Information: Reports (3) More Mapped Information

47. Corbally Limerick Feb 1997 — Start Date: 10/Feb/1997
County: Limerick — Flood Quality Code: 3
Additional Information: Photos (1) Reports (3) More Mapped Information

48. Corrib Drive Limerick Oct 1995 — Start Date: 24/Oct/1995
County: Limerick — Flood Quality Code: 3
Additional Information: Reports (1) More Mapped Information

49. Limerick Dock Rd Jan 1995 — Start Date: 25/Jan/1995
County: Limerick — Flood Quality Code: 3
Additional Information: Photos (1) More Mapped Information

50. Longpavement Road Limerick Jan 1995 — Start Date: 17/Jan/1995
County: Limerick — Flood Quality Code: 3
Additional Information: Reports (1) More Mapped Information

51. Limerick Abbey River Athlunkard area May 1994 — Start Date: 03/May/1994
County: Limerick — Flood Quality Code: 2
Additional Information: Photos (2) Reports (2) More Mapped Information

52. Clancy's Strand Limerick Jan 1994 — Start Date: 26/Jan/1994
County: — Flood Quality Code: 2
Additional Information: Photos (5) Reports (1) More Mapped Information

53. Sarsfield St Arthur's Quay Limerick City Feb 1990 — Start Date: 21/Feb/1990
County: — Flood Quality Code: 2
Additional Information: Photos (8) More Mapped Information

54. Limerick City Clancy's Strand Feb 1990 — Start Date: 01/Feb/1990
County: — Flood Quality Code: 2
Additional Information: Photos (1) More Mapped Information

55. Cathedral Place Limerick Recurring — Start Date:
County: Limerick — Flood Quality Code: 3
Additional Information: Reports (2) More Mapped Information

56. Shannon Corbally Limerick Recurring — Start Date:
County: Limerick — Flood Quality Code: 3
Additional Information: Reports (2) Press Archive (7) More Mapped Information

57. Ashbrook Gardens Limerick Recurring — Start Date:
County: Limerick — Flood Quality Code: 4
Additional Information: Reports (1) More Mapped Information

58. South Circular Road St Mary's Limerick Recurring — Start Date:
County: Limerick — Flood Quality Code: 4
Additional Information: Reports (1) More Mapped Information

59. Limerick Adjacent Courthouse undated — Start Date:
County: Limerick — Flood Quality Code: 3
Additional Information: Photos (1) More Mapped Information

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Appendix D:

Irish Coastal Protection Strategy Study

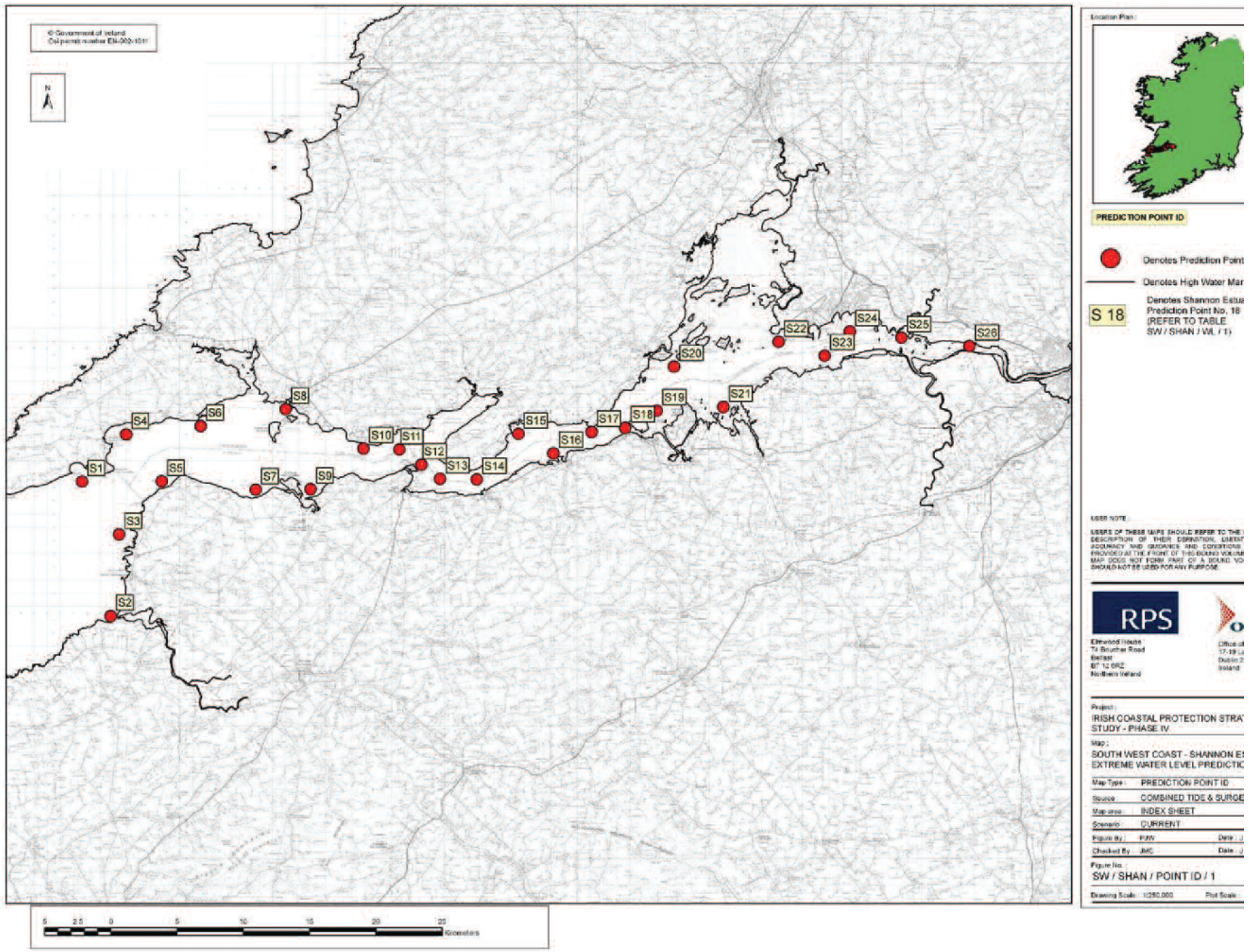
ICPSS PHASE IV - SHANNON ESTUARY									
Predicted Extreme Water Levels Associated with Combined Tide and Surge									
PREDICTION POINT ID	ANNUAL EXCEEDENCE PROBABILITY (AEP)								CO-ORDINATES OF
	50%	20%	10%	5%	2%	1%	0.5%	0.1%	EASTINGS
S1	2.64	2.76	2.85	2.94	3.06	3.15	3.23	3.43	82688
S2	2.71	2.82	2.91	2.99	3.10	3.18	3.26	3.44	84845
S3	2.73	2.85	2.93	3.02	3.13	3.22	3.30	3.49	85474
S4	2.71	2.83	2.92	3.01	3.12	3.21	3.30	3.50	86013
S5	2.72	2.84	2.92	3.01	3.12	3.20	3.29	3.48	88695
S6	2.74	2.86	2.95	3.03	3.15	3.24	3.32	3.52	91646
S7	2.77	2.89	2.98	3.07	3.18	3.27	3.35	3.55	95785
S8	2.76	2.89	2.98	3.07	3.19	3.28	3.37	3.58	98052
S9	2.79	2.91	3.00	3.09	3.20	3.29	3.37	3.57	99936
S10	2.75	2.87	2.96	3.05	3.17	3.26	3.35	3.55	103931
S11	2.77	2.89	2.99	3.08	3.20	3.29	3.38	3.59	106638
S12	2.72	2.84	2.93	3.02	3.13	3.21	3.29	3.48	108294
S13	2.70	2.83	2.92	3.01	3.12	3.21	3.30	3.50	109699
S14	2.72	2.85	2.94	3.03	3.15	3.24	3.33	3.53	112483
S15	2.72	2.86	2.96	3.06	3.20	3.30	3.40	3.63	115609
S16	2.75	2.89	3.00	3.10	3.24	3.34	3.45	3.69	118265
S17	2.78	2.93	3.04	3.16	3.30	3.42	3.53	3.79	121126
S18	2.83	2.99	3.11	3.22	3.38	3.50	3.62	3.89	123686
S19	2.89	3.04	3.17	3.29	3.45	3.57	3.69	3.97	126062
S20	2.93	3.09	3.22	3.34	3.51	3.63	3.76	4.05	127363
S21	3.03	3.20	3.32	3.45	3.61	3.74	3.86	4.15	131090
S22	3.12	3.31	3.44	3.58	3.75	3.89	4.02	4.33	135251
S23	3.18	3.37	3.52	3.66	3.86	4.00	4.15	4.48	138731
S24	3.22	3.42	3.57	3.72	3.92	4.07	4.21	4.56	140612
S25	3.29	3.50	3.66	3.81	4.02	4.17	4.33	4.68	144515
S26	3.40	3.64	3.82	4.00	4.24	4.41	4.59	5.00	149662

Notes

1 - All water levels shown are in metres and referenced to Ordnance Datum Malin

2 - All co-ordinates shown are in Irish Grid (TM65)

3 - AEP denotes Annual Exceedence Probability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5 2.5 0 5 10 15 20 25
Kilometers
Location Plan :
PREDICTION POINT ID
Denotes Prediction Point
Denotes High Water Mar
S 18
Denotes Shannon Estua
Prediction Point No. 18
(REFER TO TABLE
SW / SHAN / WL / 1)
USER NOTE :
RPS
Elmwood House
74 Boucher Road
Belfast
BT 12 6RZ
Northern Ireland
Project :
IRISH COASTAL PROTECTION STRA
STUDY - PHASE IV
Map :
SOUTH WEST COAST - SHANNON E
EXTREME WATER LEVEL PREDICTIO
Map Type : PREDICTION POINT ID
Source : COMBINED TIDE & SURGE
Map area : INDEX SHEET
Scenario : CURRENT
Figure By : PJW
Checked By : JMC
Figure No. :
SW / SHAN / POINT ID / 1
Drawing Scale : 1:250,000
Plot Scale :

Appendix E:

Site Pictures

View along footpath
on Flood Embankment

View 2 along footpath
looking away from Limerick City

St Mary's Park as viewed from the walkway around St Mary's park

St Minchin's 'St, St Mary's Park

St Ita's Street,
St Mary's Park

View from St Ita's Street
towards the Shannon

Appendix F:

Flood Reports

Flooding in Limerick City Area. November 2009

Extensive flooding occurred in the Limerick City Area following a prolonged period of very intensive rainfall in the Shannon Basin. Aerial Photographs were taken during a Helicopter Flyover on the 23rd. November 2009.

AERIAL PHOTOGRAPH OF LIMERICK CITY AREA LOOKING IN A WESTERLY DIRECTION.

1

AERIAL PHOTOGRAPH OF AREA LOOKING IN A NORTH EASTERLY DIRECTION.

AERIAL PHOTOGRAPH OF AREA LOOKING IN A WESTERLY DIRECTION.

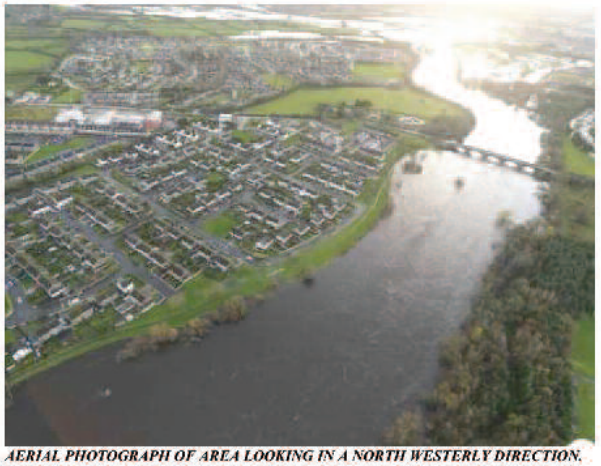
2

AERIAL PHOTOGRAPH OF AREA LOOKING IN A NORTHERLY DIRECTION.

AERIAL PHOTOGRAPH OF AREA LOOKING IN A NORTHERLY DIRECTION.

3

AERIAL PHOTOGRAPH OF AREA LOOKING IN A NORTH EASTERLY DIRECTION.



AERIAL PHOTOGRAPH OF AREA LOOKING IN A NORTH WESTERLY DIRECTION.

4

AERIAL PHOTOGRAPH OF THE CORBALLY AREA

REPORT

ON

LIMERICK CITY FLOODING

FEBRUARY 2002

INTRODUCTION

On the morning of 11th February 2002, Limerick City experienced its highest tide since 1961, with a tide level of 4.27AOD. (Christmas 1999 was 4.20AOD). This was caused by a combination of heavy rain, low atmospheric pressure, westerly winds, and a spring tide. Flooding in Limerick City can also be contributed to by the release of water from the E.S.B. power station at Ardnacrusha.

This flood identified areas of Limerick City that are susceptible to flooding whenever the above combinations of weather elements are experienced. It has been found in Limerick that such flooding occurs two to three times a year, predominantly in the springtime. Each of these areas is dealt with separately in this report. It is hoped that by identifying these areas now, and carrying out preliminary studies with a view to detailed studies and subsequent remedial work in the near future, we can reduce the risk of flooding to these same areas.

CLANCY STRAND

Introduction:

Approximately 560m long, Clancy Strand runs along the west side of the River Shannon, between Sarsfield Bridge and Thomond Bridge.
From Sarsfield Bridge to the Strand Barracks, the wall appears to be in good condition, constructed from regular cut limestone blocks. The wall is 0.5m thick, and 1.3m higher than road level, sloping with the fall in the road towards the barracks. Across from the barracks, a break is created in the wall by a semi-circular recreational/seating area, which extends into the Shannon. From the enclosed photographs, it can be seen that the wall consists mainly of large cut limestone blocks topped with a large base stone, upon which dressed limestone blocks are placed. The large cut limestone blocks act as a retaining structure while the dressed stone is for both retaining and aesthetics. The top of the wall is finished with a coping stone.
From the Strand Barracks to Thomond Bridge, the wall is of lesser quality construction, made of regular stonework. There are a large number of open joints, and an abundance of plant life growing from the wall. It is 0.5m wide, and approximately 0.6m above the road level, and maintains this constant level to the bridge.

Flooding:

During periods of high tide and heavy rain, Clancy Strand is particularly susceptible to flooding. During the February 2002 floods, Approximately 80% of the Strand was under 300-600mm of water, with associated risk of flooding to adjacent properties. This has become a regular occurrence over the past number of years. This flooding is caused by a combination of heavy rain, high tide, low atmospheric pressure, and a strong west, south westerly wind. Flooding can also be contributed to by the release of water from the E.S.B power station at Ardnacrusha.

Recommended Works:

Flooding in Clancy Strand occurs in the following ways:
(a) Water percolating through the wall and coming to the road surface through road joints.
(b) Water coming through open wall joints.
(c) Flood water coming over the river wall.
(d) Rainwater and floodwater backing up along the outfall systems.
Recommended works could necessitate the following:
(a) Increasing the height of the wall to cater for increasing flood levels.
(b) Strengthening the wall to make it a safe retaining structure.
(c) Pressure grouting the wall.
(d) Associated special drainage works.

Costs Estimate: **€500,000.00**

CLANCY STRAND IN FLOOD: FEB 2002

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CLANCY STRAND FLOOD, FEB 2002

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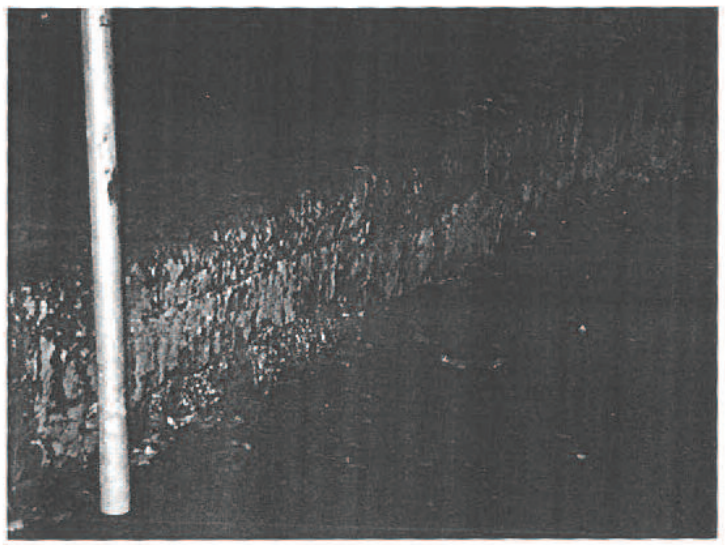

CLANCY STRAND WALL.

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O'CALLAGHAN STRAND

Introduction:

O'Callaghan Strand runs along the west side of the river Shannon, between The Shannon Bridge and Sarsfield Bridge. The Strand is approx. 400m long. The river wall finishes at road level for approx. 300m of the Strand, before stepping up to 1.3m height for the remaining 100m, finishing at Sarsfield Bridge.
The wall is of good quality construction, of large cut limestone blocks. All joints appear closed, and no dislodgement of blocks is evident. A large section of the wall, from the slipway to the steps, is constructed with a battered profile. (off-vertical)

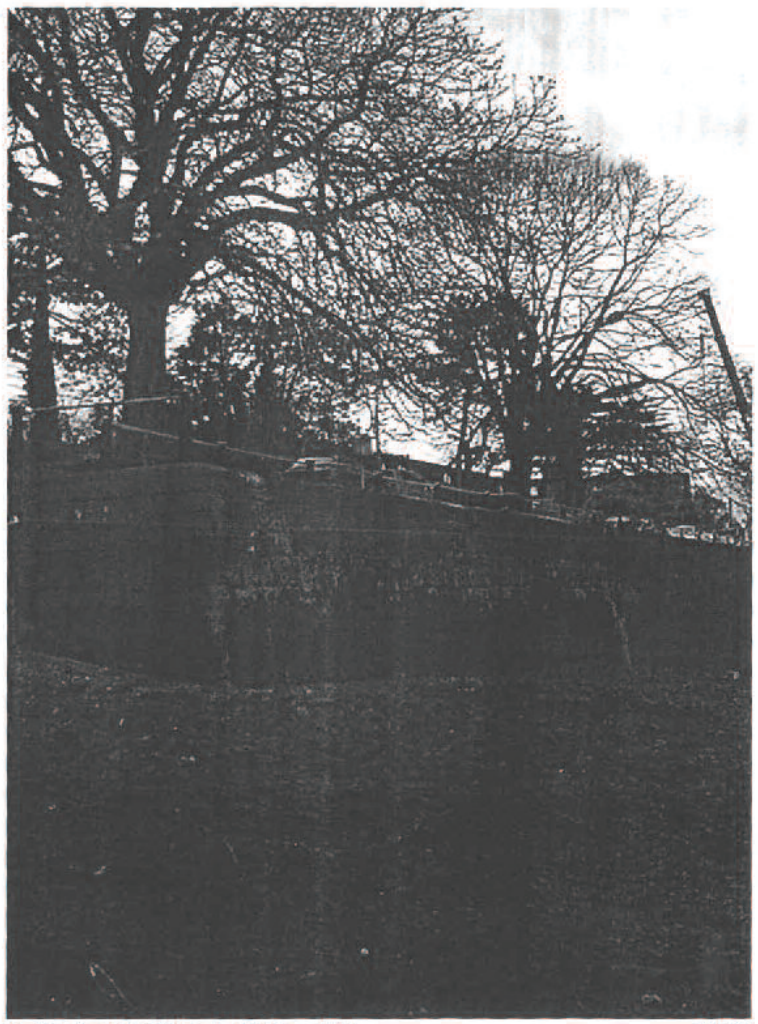
Flooding:

O' Callaghan Strand floods on a regular basis, similar to Clancy Strand, but not to the same extent. The flooding is caused by low atmospheric pressure, high tides, heavy rain, and west south westerly winds. The flooding can also be contributed to by the release of water from the power station at Ardnacrusha. The flooding is restricted to the 300m of the strand where the quay wall finishes at road level.

Recommended Works:

The provision of a low retaining wall (300-450mm) and the installation of a number of pumps should alleviate the risk of flooding in this area.

Estimated Costs: **€100,000.00**



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SIR HARRYS MALL

Introduction:

Harrys mall runs south from Athlunkard St., under the Abbey Bridge to Baal's Bridge. The river wall is approximately 325m long, 0.5m thick, and 1.2m high. From Athlunkard St to the Abbey Bridge it appears to be constructed of old mass concrete. It appears to be structurally sound barring a number of cracks along its length. For the short length between the Abbey Bridge and Baal's Bridge, the wall is of extremely good construction, possibly quite recent, and is made up of both old stonework and large cut limestone blocks. All stone joints appear to be closed with no obvious stone dislodgement. It is of similar dimensions to the other section of wall.

Flooding:

In recent years, Harrys Mall has being one of the worst affected areas in Limerick for flooding resulting in a number of properties suffering flood damage every year. The flooding is caused by a combination of high tide, west, south westerly winds, heavy rain, and low atmospheric pressure. The flooding can also be contributed to by the release of water from the power station at Ardnacrusha. This flooding results in the flood waters lapping over the wall and spewing through its many cracks, seeping up through the road joints, and rising up from the road gullies. In the Spring of 2001, under the Limerick Main Drainage Project, 2 No underground Pumps and Sumps were installed. These pumps are switched on automatically in times of high ground water levels, and their function is to pump floodwaters back into the river. These pumps have been very sucessful with a considerable reduction in flooding in the area in February 2002.

Recommended Works:

Harrys Mall could be considered a high risk area in need of immediate remedial works due to (a) the considerable height of a mass concrete wall of undetermined strength, with some cracking present, and (b) the immediate proximity of a large number of dwellings and businesses, all at low level.
Recommended works could necessitate the following:

(a) Increase the height of the wall to cater for the possibility of more extreme weather conditions. Due to the existing wall height, this may also necessitate the provision of a footpath/walkway beside the wall.
(b) Strengthen the wall to make it a safe retaining structure.
(c) Pressure grout the wall.
(d) Associated special drainage works.
(e) Further pump installations close to the Abbey Bridge.

Costs Estimate: **€500,000.00**

SIR HARRYS MALL WALL, AS VIEWED FROM RIVERBANK.

SIR HARRYS MALL WALL CRACK

SIR HARRYS MALL FLOOD, FEB 2002

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CORBALLY ROAD RIVERBANK

Introduction

The Corbally road runs from Athlunkard St to Athlunkard bridge and is the only direct link from Corbally to the city centre.

Flooding

The Corbally riverbank protects the Corbally road from the Abbey river. During periods of flood conditions, brought on by high tides, low atmospheric pressure, heavy rains, west south westerly winds, and possible release of water from the E.S.B. power station at Ardnacrusha, the Abbey river tops the Corbally riverbank and floods the Corbally road. The flooding is evident mainly from O' Dwyer bridge to Janesmount Terrace, and can be 600-900mm deep, (as evident in February 2002 floods).

Recommended Works

A section of the Corbally riverbank (approx. 400m) needs to be raised, to accommodate existing flood levels, and potential increasing flood levels.

Estimated Costs: **€150,000.00**

CORBALLY RD FLOOD, FEB 2002

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CORBALLY ROAD FLOOD, FEB 2002

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ST. MARY'S PARK

Introduction

St. Mary's Park is one of 3 local authority housing estates located in Kings Island, which is situated on the north side of the city. Access to St. Marys Park is limited to the Island Road which leads onto St. Ita's street, or alternatively Verdant Place, which also leads to St. Ita's street. King's Island is literally that-an island surrounded on all sides by the Shannon. It extends over an area of 170 acres and measures 1 mile long by a quarter of a mile wide.

Flooding

During periods of flood conditions, rainwater backs up along the outfall pipes and causes flooding at the junction of Verdant Place and St. Ita's street, which continues all along the length of Verdant Place. Where Verdant Place runs parallel to the Shannon, this flooding is also contributed to by the high tide lapping over the wall, and water percolating through the wall. The flooding is caused by a combination of high tide, west, southwesterly winds, low atmospheric pressure, heavy rain, and sometimes contributed to by the release of water from the E.S.B. power station at Ardnacrusha.

Recommended Works

Remedial measures could necessitate the following:

(a) Increasing the river wall height along Verdant Place.
(b) Pressure grouting behind the wall.
(c) Associated special drainage works.
(d) Strengthening the wall to make it a suitable retaining structure.
(e) Installation of a submersible pump in the approximate location of the junction of St. Ita's street and |Verdant Place, to pump flood waters to the Shannon in times of flooding.

Verdant Place

/ not as shown)

Costs Estimate: **€100,000.00**

VERDANT PLACE FLOODING - FEB 2002

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VERDANT PLACE & ST. ITA'S ST
FEB 2002 FLOODING.

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CONDELL ROAD RIVERBANK

Introduction:

Condell Road is one of three main thoroughfares leading into Limerick City from Clare. Approximately 800m of the road runs parallel to the Shannon, prior to crossing over to the city centre via the Shannon Bridge. On the other side of Condell Road where it runs parallel to the Shannon is an area of wetlands known as Westfields.

Flooding:

Condell road is protected from the Shannon by a basic earth embankment, approximately 3m wide at its base, tapering to 1m wide at the top. Approximately 100m of this embankment appears to have settled over the years resulting in a drop in level of approximately 300mm. During periods of flood conditions, which are caused by high tides, low atmospheric pressure, heavy rains, and west south westerly winds, Flood waters can now flow over the bank and flood Condell Road, creating obvious dangers and difficulties to drivers. The flooding can also be contributed to by the release of water from the power station at Ardnacrusha.

Recommended Works:

A concise topographic survey of the river bank would identify areas that need work. Increasing the height of the bank with consolidated material and geotextile membrane should suffice in low areas. Potential breach areas may require the installation of gabion baskets.

Estimated Costs: **€70,000.00**

CONDELL ROAD EARTH EMBANKMENT.
NOTE CHANGE IN LEVEL.

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CONDELL ROAD IN FLOOD, FEB 2002

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BISHOPS QUAY-CUSTOM HOUSE QUAY

Introduction:

These quays run east of the Shannon, from the Shannon Bridge, up past Sarsfield Bridge as far as Custom House Quay. The overall length of the river wall is approx. 900m, with the top of the wall at one level with the road. The wall is made up of regular cut limestone block, generally of good construction but with some open joints and facing block dislocations. The wall has a slightly battered vertical profile while a slight bulge in the wall is evident beside the steps in Howleys quay.

Flooding:

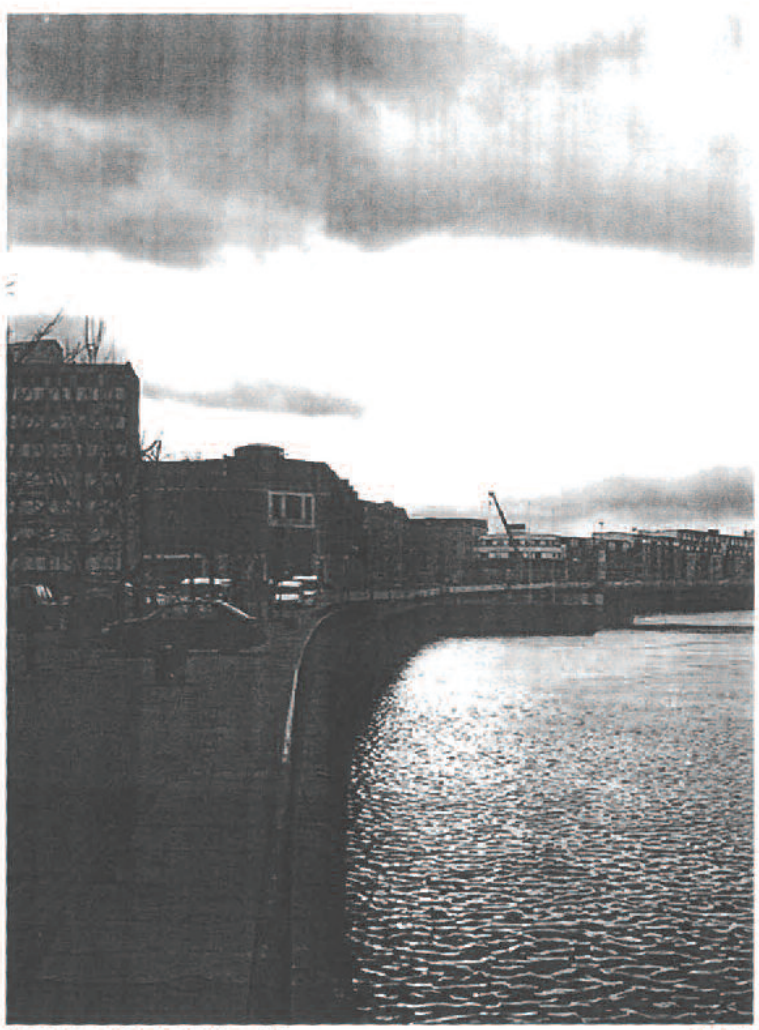
Bishop's Quay to Honan's Quay has always escaped the worst of the flooding in Limerick City. However, what has become apparent is the potential risk of flooding in this area. During the February 2002 floods, the water came to within approximately 150mm of the top of the quay walls. Considering the potential for more extreme weather conditions in the future, and in light of the recent commercial developments in the area, we feel it is imperative that some works are carried out to combat potential flooding.
During the February 2002 floods, Custom House Quay was flooded with up to 300mm of water. This flooding was caused by heavy rain, low atmospheric pressure, high tide, and west south westerly winds.

Recommended Works:

Remedial measures could necessitate the construction of a low (300-450mm) retaining wall along the full length of the quay, and the installation of a pump in the Custom House Quay area.

Estimated Cost: **€150,000.00**

HARVEYS QUAY WALL.



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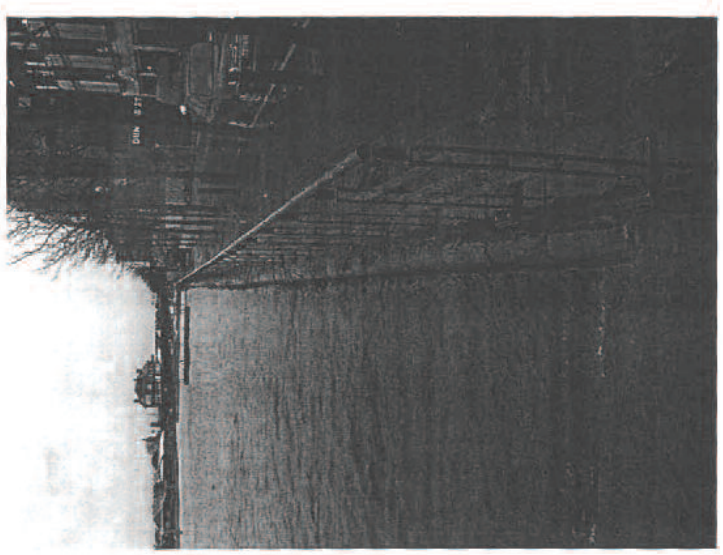
THE BISHOPS QUAY WALL.



Howleys quay - Feb 2002

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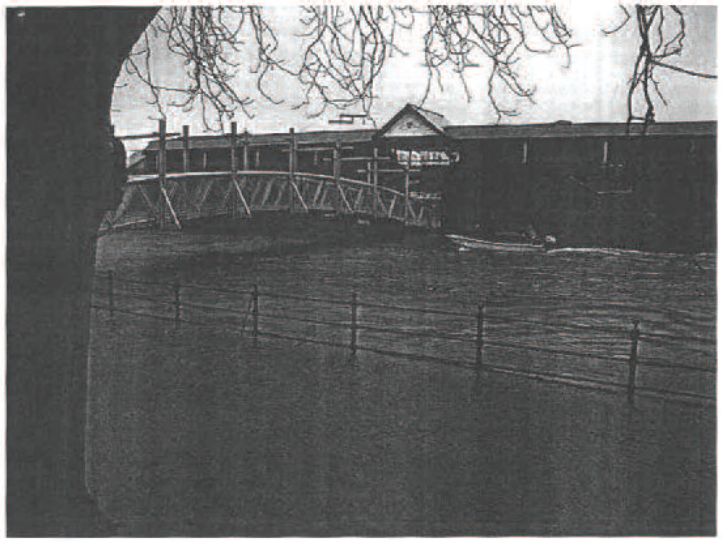

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SARSFIELD House Flooding - FEB 2002

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SARSEFIELD HOUSE FLOODING.

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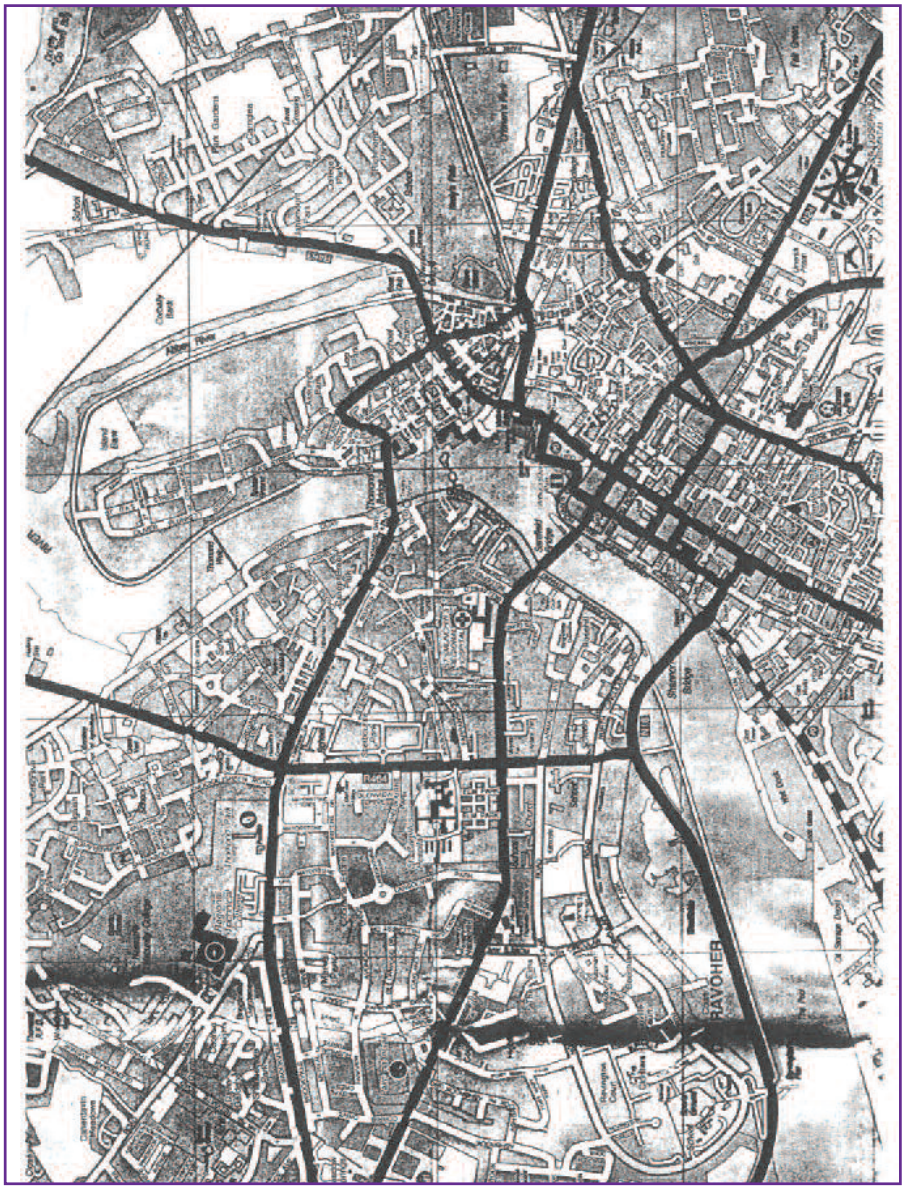

SECTION 1 Introduction

1.1 Limerick has suffered from flooding since the foundation of the city. Flooding occurs when events, which alone might not cause flooding, coincide. These events are high tides, low atmospheric pressure accompanied by south westerly winds and high flows in the River Shannon.

1.2 The entire reach of the River Shannon and its arm, the Abbey River within the city is tidal. Water levels in the river due solely to the tidal cycle range from –2.77mA.O.D. (M.L.W.S) to +2.73mA.O.D. (M.H.W.S). Even a high tide at +2.73mA.O.D. will not cause flooding of itself as road levels adjacent to the river are of the order +3.5mO.D.. However the actual level of tides can be greatly influenced by atmospheric pressure and weather conditions. Low atmospheric pressure results in an increase in the level of the tide above the predicted level while high pressure has the opposite effect. Also westerly winds will increase the tide levels while offshore winds will again have an opposite effect. Wave action on the water surface resulting from the wind increases the effective water level. These effects can increase the water level by over 1.5 metres.

1.3 Flows in the River Shannon also have a major effect on flood levels in Limerick city. Flows in the River Shannon result from discharges by the ESB at Ardnacrusha and Parteen and uncontrolled flows from the Mulcair and other tributaries.

1.4 Flooding due to the above can be agravated by local flooding caused by heavy rainfall. With the river at a high level due to tidal or flow conditions local flooding cannot run off without pumping.

1.5 The flooding which occurred over the Christmas/New Year period 1999 was due to all of the above.

LIMERICK MAIN DRAINAGE (City & Environs)
Report on Flooding – December 1999

SECTION 2 Flood Event – Christmas/New Year 1999

2.1 Spring tides were predicted to occur from Tuesday 21st December to Sunday 26th December 1999 with the highest tide predicted to occur on the morning of Friday 24th December. The level that this high tide was predicted to reach was 2.8mAOD. This was not a particularly high tide as similar tides occurred in October and November. On this occasion however the high tides coincided with a period of very low atmospheric pressure and also strong westerly winds, which had the effect of increasing the level of the high tide to approximately 4.1mAOD as recorded by the Shannon Ports gauge at Limerick docks. The wave action caused by the strong westerly winds increased this height further to give an effective height of approximately 4.3mAOD.

2.2 In addition flows in the River Shannon were very high at this time. Prior to the heavy rainfall before Christmas the ESB had hoped to keep total discharges to approximately 550cu.m/scc. In the event discharges increased to approximately 700cu.m/sec on 27th December. The heavy rainfall also increased flows in local tributaries adding over 100cu.m/sec to the flows in the River Shannon.

2.3 The combination of the high tide, atmospheric pressure and wind as well as the increased flow in the local rivers caused the water level in both the Shannon and Abbey rivers to reach a maximum of 4.4mAOD in some areas. Flooding occurred in many areas throughout the city which were of a lower elevation than this.

2.4 The most serious flooding occurred between the evenings of the 24th and 25th December. Between Thomond Bridge and Sarsfield Bridge the water level rose to approximately 4.2mAOD with the flood tide. The water over-topped the quay wall along Clancy's Strand and submerged the roadway under as much as 0.7m of water. A small number of properties in the area became flooded and the water quickly dissipated with the ebbing tide. The road along O'Callaghans Strand was flooded on the morning of the 25th. The road itself was impassable for a short period however properties in the area were not affected. Flooding in both these areas coincided with times of high tide and generally receded as the tide ebbed.

2.5 In the Abbey river the water reached a level of 4.4mAOD. This was higher than that reached at Sarsfield Bridge as the increased flow in the Shannon had a greater effect in this area. A large area within the reach of the Abbey river is low lying with levels as low as 2.4mAOD in some cases. Part of the road along Sir Harry's Mall and Athlunkard Street is in the region of 3.5 to 3.8mAOD. It was along this area of the Abbey river that flood waters had difficulty in receding. Along Sir Harry's Mall the remaining flood water had to be pumped over the quay wall almost a week after the flooding took place. A total of eighteen properties along Sir Harry's Mall were flooded with the level of the flood water rising to 0.5m above ground floor level in some cases. Twelve properties along Keyes

Row were similarly affected as well as nine properties along Athlunkard Street. Thirteen properties along the North side of Athlunkard Street were flooded when the banks of the Abbey River up-stream of O'Dwyer Bridge were breached.

2.6 Upstream of O'Dwyer Bridge the Abbey River over-topped its banks on both sides causing the Corbally Road to flood as well as the road and properties along Athlunkard street. Here the top of the bank varies from 3.8 to 4.3mAOD on the city side of the river. It is further protected by a wall. However this wall was also breached in places. On the Corbally side of O'Dwyer Bridge a large area of park-land was flooded as well as the Corbally Road and College Park. The level in this region is of the order 3.9 to 4.2mAOD.

2.7 Merchant's Quay was flooded together with the Custom House Quay onthe other side of the Abbey river. Flooding wasn't serious in these areas as they are mostly above 4.0mAOD. The flood waters have receded with the falling tide.

LIMERICK MAIN DRAINAGE (City & Environs)
Report on Flooding – December 1999

SECTION 3 Damage to Property

3.1 Up to a total of sixty houses were flooded with resulting damage to property. Most seriously affected were houses between Sir Harry's Mall and Athlunkard Street. It is understood that the residents/owners will be seeking compensation

SECTION 4 Limerick Main Drainage

4.1 The Limerick Main Drainage Project includes works referred to as the Abbey River Interceptor Sewer and Navigation Scheme. This scheme includes the construction of a sewer from a point on Harvey's Quay between Shannon Street and Bedford Row through Sarsfield Lock, across from Shannon Rowing Club to Couragour Point and up the Abbey River. The scheme also includes construction of a weir from Shannon Rowing Club to Couragour Point to assist navigation in the Abbey River.

4.2 To construct these works a number of temporary berms are required in the Abbey and Shannon Rivers. Over the Christmas/New Year period berms were in place in Sarsfield Lock and just downstream of it. Construction of a berm from Shannon Rowing Club to Couragour Point had also started.

4.3 In addition two temporary berms had been constructed in the Abbey river. The first of these was constructed between Sir Harry's Mall and Lock Quay and effectively blocked off the river at that point. The level of the top of this berm was 3.5mAOD which was marginally lower than surrounding areas. This had the effect that in the event of an increase in water level in the Abbey river the berm would be over-topped before the surrounding areas became flooded. The second berm was constructed between Georges Quay and Bank Place. This second berm had the effect of preventing the tide from flowing up the Abbey river.

4.4 The high tide influenced by the high westerly winds and low atmospheric pressure was responsible for dictating the level that the water in the Abbey River reached during the flood. On 23rd and on the morning of the 24th December the second berm was preventing the tide from flowing up the Abbey River. The tide was flowing up the Shannon river and then down the Abbey River as far as the first berm. Some flooding did occur and the upper berm was over-topped. On the evening of 24th and subsequently on the 25th and 26th the level of the high tide was such that both berms were over-topped. The berms were not responsible for the flooding but they may subsequently have been responsible for preventing some of the flood waters in the area adjacent to the Abbey River and above the first berm from receding with the ebbing tide. On 27th December the top of the berms was reduced by 1.0m which had the effect of slightly reducing the water level in the Abbey river While the flow in the Shannon remained high these berms were further breached on subsequent days to try to help reduce the water level upstream of the first berm. However the effect was minimal.

4.5 ESB International was commissioned in 1999 by Limerick Main Drainage to prepare a report on the effect that the construction of temporary bunds would have on flows and water levels in both the Shannon and Abbey Rivers. The report forecast that at flood periods the water level in the Shannon and the Abbey Rivers would increase by approximately 0.2m. It is not possible to say with certainty if this happened during the Christmas/New Year flood.

SECTIO N 5 History of events

5.1 23/12/99

Water level exceeded 3.5mAOD in the Abbey river during the period of high tide in the morning and similarly in the evening. As a result the upper berm (between Sir Harry's Mall and Lock Quay) was over-topped and the works in the Abbey river were flooded. This flooding however was alleviated by pumping between the periods of high tide.

The road along Sir Harry's Mall was flooded by water coming from the Abbey river up through storm drains and road gullies. The road along Clancy's Strand also experienced slight flooding while the tide was at its highest.

Uniform Construction Ltd. provided protection to the Merchants Quay area by way of sand-bags.

5.2 24/12/99

The water level in the Abbey river again exceeded 3.5m with the morning tide and the Limerick Main Drainage works there were again flooded. Due to the increased flow in the Shannon together with the local rainfall the pumps could not cope with the amount of water now coming into the works. The water level in the Abbey river remained high with the ebb tide as the Shannon was now in full flood condition. The amount of rainfall occurring throughout the entire catchment area of the Shannon had now required the ESB to increase discharges from Parteen Weir which together with increased flows from uncontrolled tributaries had led to increased river flows through Limerick. Sir Harry's Mall area was now experiencing serious flooding with properties being threatened.

Clancy's Strand experienced flooding similar to that of the previous day. Although the river wall helped prevent flooding the level of the tide was higher than that of the road and water came up through gullies etc.

With the flood tide in the evening the water level rose to 4.2m AOD. Flooding now extended to George's Quay and upstream of O'Dwyer bridge. Fire Brigade was in attendance at Athlunkard Street where properties were being flooded.

Along Clancy's strand the roadway was now impassable and properties were being threatened. Uniform Construction Ltd. placed protection to properties along Clancy's Strand.

5.3 25/12/99

The water in the Abbey river over-topped the quay wall. Merchants Quay together with an area surrounding the Civic offices was flooded. From George's Quay along Sir Harry's Mall to Athlunkard street was completely submerged and impassable with serious flooding to properties.

The road along Sir Harry's Mall was under almost 1.0m of water. This however receded with the ebb tide.

Athlunkard Street was also impassable with flooding occurring on both sides of the river at O'Dwyer bridge. This also caused flooding of the Corbally road. The Fire Brigade were in attendance here once again.

Almost the entire stretch of Clancy's Strand was flooded as well as part of O'Callaghan Strand. Five houses on Clancy's Strand suffered flooding and the road along here was impassable. This flooding again receded with the ebb tide.

The evening tide did not reach the same level as the morning tide did however properties from Sir Harry's Mall to Athlunkard Street were still suffering severe flooding with the fire services remaining in attendance all day.

5.4 26/12/99

Minor flooding occurred at George's Quay coinciding with the morning high tide. A large area between Sir Harry's Mall and Athlunkard Street was still flooded with the fire services still in attendance.

Flooding also occurred along Clancy's Strand coinciding with the high tide. Limerick Corporation and Uniform Construction Ltd. held a meeting with regard to flooding in the Abbey River. There was a general agreement however that no action could be taken while water levels were as high as they were.

5.5 27/12/99

The road along Sir Harry's Mall was flooded. Clancy's Strand was flooded for duration of high tide only. A meeting was held between Limerick Corporation, Limerick Main Drainage and Uniform Construction Ltd. and as a result of concern that the berms on the Abbey River were preventing flood waters from receding along Sir Harry's Mall it was decided that the berms between Sir Harry's Mall and Lock Quay should be breached. A 1.0m deep channel was excavated through each berm. This work was completed by midnight.

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5.6 28/12/99

The road along Sir Harry's Mall was still flooded however flood waters on Athlunkard Street had receded. A further meeting was held between Limerick Corporation, Limerick Main Drainage and Uniform Construction Ltd. where it was agreed that no further action could be taken in the meantime.

5.7 9/12/99

The berm between Sir Harry's Mall and Lock Quay was reduced further in order to try and reduce the water level in the Abbey river. The road along Sir Harry's Mall was still flooded.

Limerick Corporation met with representatives of the residents to discuss action to be taken. Residents were generally dissatisfied with the situation with respect to the blocking off of the Abbey River which they claim was the cause of the flooding. Limerick Corporation were made aware that the residents would be claiming compensation for damage caused to their properties by flooding.

5.8 30/12/99

Further reduction to the berm took place as instructed by Limerick Main Drainage. Road along Sir Harry's Mall was still flooded. The water level in Abbey River was remaining high and not receding with the ebb tide.

5.9 31/12/99

A further meeting was held to discuss if any further action could be taken with regard to high water levels in the Abbey River. A representative from the ESB was in attendance to clarify their position with regard to controlling flows in the Shannon.

Limerick Corporation were successful in pumping the flood water from the road at Sir Harry's Mall into the Abbey river.

Summary

1 Severe flooding occurred in Limerick City during the period between 23rd and 31st December 1999 with the most serious flooding starting on the evening of 24th December 1999.This flooding occurred when a Spring tide coincided with a period of westerly winds, low atmospheric pressure and persistent rainfall. The areas worst affected were Clancy's Strand, O'Callaghan's Strand, Merchants Quay, George's Quay, Sir Harry's Mall, Athlunkard Street and Corbally Road.

2 Prior to the flooding Limerick Corporation as well as the Limerick Main Drainage team had received five day weather forecasts from the Irish Meteorological Service which had indicated heavy rainfall on Wednesday 22nd December 1999. Only light rainfall was forecast for 23rd and 24th December 1999. Tide tables consulted had predicted high tide levels on 24th December 1999. However the levels forecast were similar to those in October and November which had not caused any problems. Also the ESB advised the Limerick Main Drainage team that they expected to be able to keep discharges from Ardnacrusha and Parteen at a level that should not cause flooding in Limerick. In light of this information while some flooding was anticipated this was expected to be limited and precautions were taken to deal with this.

3 However on the 24th December the atmospheric pressure dropped to 967.5 hpa and the winds increased from a westerly direction. This had a major effect on the tide level causing an increase of 1.3m above the predicted level. Also heavy, prolonged rainfall leading up to the 24th December led to discharges from Ardnacrusha and Parteen being increased from 525cu.m/sec to 700cu.m/sec. These were both exceptional conditions and their coincidence with the forecast high tides caused the extensive and unpredictable flooding.

4 Berms constructed in the Shannon and Abbey Rivers as part of the Limerick Main Drainage Project did not cause flooding but may have increased water levels by approximately 200mm and retained water in the Abbey River.

5 Personnel from Limerick Corporation, Limerick Main Drainage and Uniform Construction Ltd. were in attendance throughout the event to try and prevent the water from gaining access to properties. The emergency services were also in attendance and assistance was provided by the Army and Civil Defence