1 INTRODUCTION

1.1 Background

This Environmental Impact Assessment Report (EIAR) for the proposed **River Poddle Flood Alleviation Scheme** has been prepared by Nicholas O'Dwyer Ltd. (NOD) on behalf of South Dublin County Council (SDCC) and Dublin City Council (DCC), working in conjunction with the Office of Public Works (OPW).

The Scheme proposes flood protection, flood storage and flood prevention measures at locations along a 6km stretch of the Poddle River from Tymon North, Tallaght to St. Teresa's Gardens and Donore Avenue, and at the National Stadium, South Circular Road, Merchant's Quay, Dublin. It combines main flood storage at Tymon Park and additional flood storage at Ravensdale Park, linear defences along the River where they are required to provide flood protection, new flap valves and culvert screens, and sealing manholes to prevent surcharging during a flood event.

The proposed Scheme is designed to provide protection against fluvial or river flooding in a 1 in 100-year flood event (1% Annual Exceedance Probability). The Scheme will provide protection for approximately 921 properties in SDCC and DCC areas.

It has been determined that the development requires the preparation of an Environmental Impact Assessment Report (EIAR) and a Natura Impact Statement (NIS). In this case, this application for local authority development will be made jointly by SDCC and DCC to An Bord Pleanála in accordance with Part X, Sections 175 and 177AE of the Planning and Development Act 2000, as amended.

This EIAR documents the assessment of the impacts on the receiving environment of the construction and operation stages of the River Poddle Flood Alleviation Scheme, the recommended mitigation measures, and any residual impacts. The requirement for flood alleviation on the River Poddle will continue for the foreseeable future, thus this EIAR does not consider environmental effects associated with a decommissioning stage of the proposed project. The assessment addresses all aspects of the environment identified in EU and national legislation and guidance.

1.2 Site Location

The River Poddle is some 11.6km in length with a catchment area of approximately 16.44km^2. The Poddle rises in the Cookstown area, north of Tallaght village flowing east through Tymon North (Tymon Park west of the M50) and into Tymon Park (east of the M50) where it passes under the M50 motorway. It flows northeast towards Greenhills/Templeogue and continues through Kimmage and the edge of Crumlin and runs through Mount Jerome into Harold's Cross. The River then crosses under the Grand Canal and flows under the city centre in a culverted section, discharging to the River Liffey. The confluence of the Poddle and the Liffey is visible at low tide at a grated opening in the Liffey walls at Wellington Quay.

As shown in **Figure 1-1**, the Poddle is a highly urbanised catchment, particularly in the middle and lower reaches where it is culverted and channelled in sections.

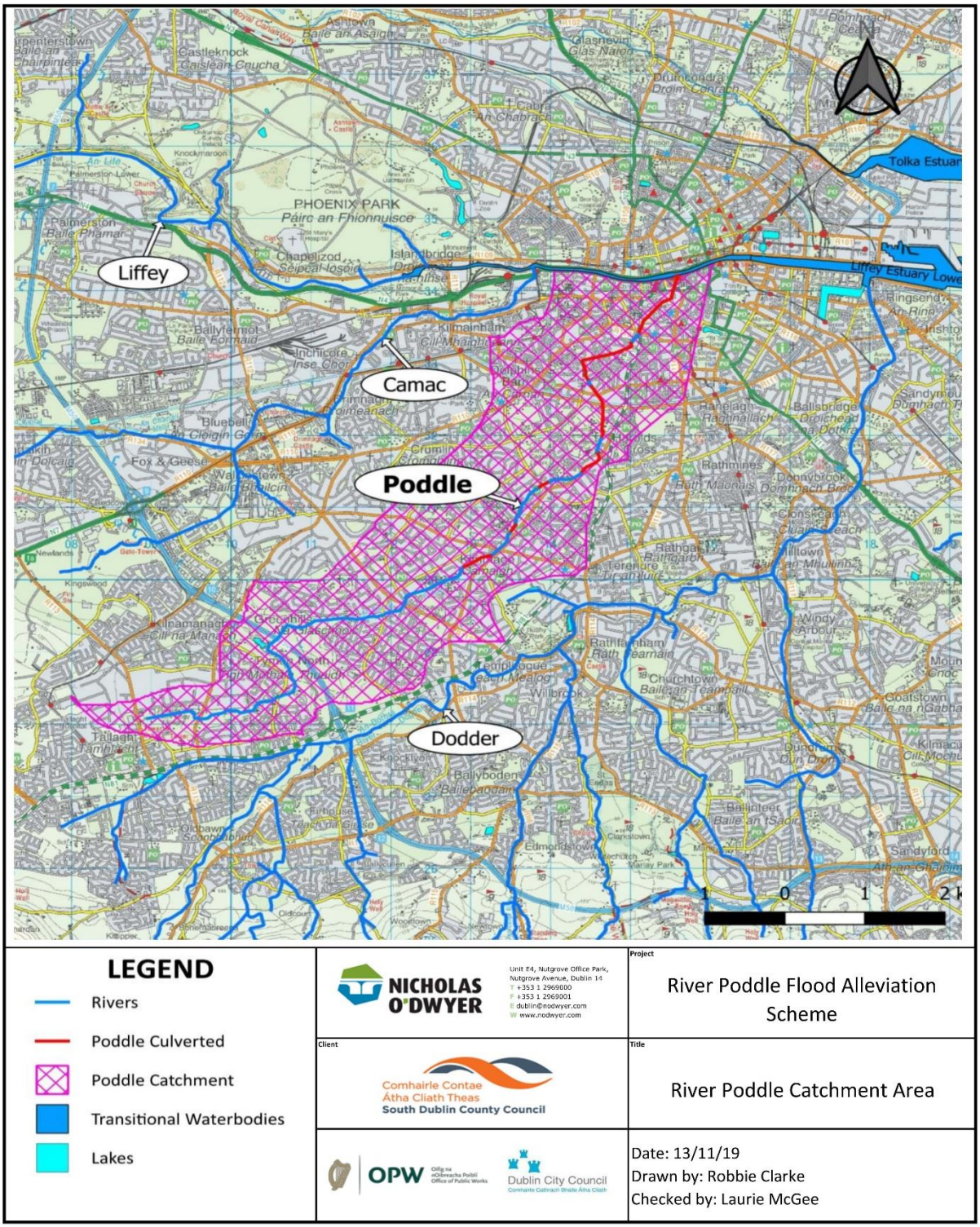

Figure 1-1: River Poddle Location

1.3 Project Promoters

The River Poddle Flood Alleviation Scheme is proposed jointly by SDCC and DCC, working in conjunction with OPW. A Steering Group comprising officials from both Councils and the OPW have overseen the project. Throughout the project design and Environmental Impact Assessment (EIA) the work of the Steering Group was co-ordinated by Mr. David Grant, Project Resident Engineer, SDCC.

1.4 Study Area

The Study Area is primarily linear, being within the floodplain and catchment of the River Poddle and the localities in the immediate vicinity of the River.

1.5 Definitions

Throughout this EIAR reference is made to the drawings which accompany the planning application by quoting the last five digits in the Drawing number. For example, **Drawing No. RPFS-NOD-01-XX-DR-C-08110** is referred to as **Drawing No. 08110**.

Tymon Park is split in two by the M50. Any reference to "Tymon North" in this EIAR is that part of the Park that lies to the west of the M50. Any reference to "Tymon Park" refers to that part of the Park that lies to the east of the M50.

1.6 Location and Description of Works

The intervention area of the proposed Flood Alleviation Scheme extends along the Poddle River from Tymon Park (west of the M50) in Tallaght to Mount Argus Close in Harold's Cross; with further works to seal manholes in the vicinity of Poddle Park and Ravensdale Park, Kimmage, and in St. Teresa's Gardens and Donore Avenue, and at the National Stadium in Merchant's Quay, Dublin.

There are three areas where more substantial works are proposed in green spaces and parks, including:

- In Tymon Park (east of the M50) where the main flood storage embankment is to be constructed and an Integrated Constructed Wetland (ICW) is also planned;
- at Whitehall Park, east of Templeville Road in Templeogue where a channel re-alignment is proposed; and
- at Ravensdale Park in Kimmage where flood walls are to be constructed to provide flood protection and storage.

Proposed ancillary works and associated development includes drainage channel clearance and removal of trees where required for the works; rehabilitating or installing culvert screens in locations as required; installing flap valves in all culverts draining to the River; biodiversity enhancements including installation of floating nesting platforms in Tymon Lake, Tymon Park, Tallaght; and landscape mitigation and restoration at Tymon Park, Tallaght, Whitehall Park, Terenure, and Ravensdale Park and St. Martin's Drive, Kimmage including public realm improvements, replacement footbridges, biodiversity enhancements, tree planting and landscaping.

Temporary works include establishing a main construction compound in Tymon Park with access off Limekiln Road, which will be in operation for the entire duration of the works.

Additional temporary works/ set down areas at Wainsfort Manor Crescent, St. Martin's Drive and Ravensdale Park, which will be in use for the duration of the works to be carried out in these locations. Other temporary works include temporary stockpiling of excavated earth in Tymon Park; temporary channel crossings at Tymon Park (west and east of the M50) in Tallaght, and channel diversions at Tymon Park, Tallaght and Whitehall Park, Templeogue to enable the works along the River channel to be carried out.

The proposed development is shown in **Drawing Nos. 08131 to 08253** of the planning drawings provided in **Part 2** of the Application Documentation.

Other works such as the ICW and the landscape mitigation incorporating landscape restoration, replacement tree planting, public realm improvements and biodiversity enhancements are not essential to the main purpose of flood alleviation. They are proposed to mitigate the landscape changes, habitat changes and tree loss that are an unavoidable impact of the Scheme. These bring added benefits to the community and environment including improved water quality, enhanced biodiversity, and improved public access and enjoyment of the parks and green spaces along the River.

1.7 Environmental Impact Assessment

1.7.1 General

The process by which the likely significant effects of a project on the environment are assessed is set out in the EU EIA Directive 2011/92/EU on the assessment of the effect of certain public and private projects on the environment (codification) (transposed to Irish law through the Planning and Development Regulations 2001, as amended), as amended by EIA Directive 2014/52/EU (transposed to Irish law through the European Union (Planning and Development) (Environmental Impact Assessment) Regulations S.I. 296 of 2018.

After adoption of the amended EIA Regulations (S. I. 296 of 2018), the Department of Housing, Planning and Local Government issued guidelines for carrying out their duties and responsibilities as set out in the EU EIA Directive titled *"Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment"* (August 2018).[1]

The Guidelines describe EIA as a process which involves:

- the preparation of an Environmental Impact Assessment Report (EIAR) by the developer
- the carrying out of consultations, the examination by the competent authority of the EIAR
- any supplementary information provided, where necessary, by the developer and relevant information received through consultations with the public, prescribed bodies and any affected Member States

[1] Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, Department of Housing, Planning and Local Government, August 2018, https://bit.ly/2SGRjvF, [accessed 26/07/19].

- the reasoned conclusion of the competent authority on the significant effects of the project on the environment

- and the integration of the competent authority's reasoned conclusion into any development consent decision.

The Guidelines focus on the procedure to be followed in screening proposals to determine whether an EIA is required; on scoping proposals to identify the information to be contained in the EIAR and the methodologies to be used in gathering and assessing the information; and on the contents of the EIAR in respect of the EU EIA Directive. Lastly, the Guidelines present the considerations for assessing a proposal and making a reasoned conclusion and determination.

1.7.2 EIA Screening

Schedule 5 of the Planning and Development Regulations identifies project types and thresholds for projects that are subject to EIA. Part 1 of Schedule 5 identifies projects of a class that will always require an EIA as set out in Annex I of the EU EIA Directive. Part 2 of Schedule 5 sets national thresholds for projects listed in Annex II of the EU EIA Directive.

The proposed flood alleviation project does not fall under a class of development listed in Schedule 5 Part 1. It is therefore necessary to screen the proposed development in relation to Schedule 5 Part 2. Schedule 5 Part 2(10) lists out categories of infrastructure projects that may require EIA in certain circumstances. Schedule 5, Part 2 (10)(f)(ii) states:

> *"Canalisation and **flood relief works**, where the immediate contributing sub-catchment of the proposed works (i.e. the difference between the contributing catchments at the upper and lower extent of the works) would exceed 100 hectares or where more than 2 hectares of wetland would be affected or **where the length of river channel on which works are proposed would be greater than 2 kilometres**."*

The length of the river channel for the proposed Flood Alleviation Scheme is approximately 5.2km. This exceeds the 2km threshold above. Therefore, an EIA is required.

1.7.3 Preparation of the EIAR

The EIAR for the River Poddle Flood Alleviation Scheme has been prepared with consideration of the Environmental Protection Agency's *"Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports"* (August 2017)[2], and the more recent *"Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment",* Department of Housing, Planning and Local Government (August 2018)[3].

[2] Environmental Protection Agency, Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, Draft August 2017, https://bit.ly/2kurbam, [accessed 04/09/19].

[3] Department of Housing, Planning and Local Government, Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, https://bit.ly/2SGRjvF, [accessed 04/09/19].

Working closely with the Steering Group and Project Manager, Engineers, Planners, and Environmental specialists from NOD led a team of competent experts in in the preparation of the EIAR. Each contributing expert provides a statement of authority, an explanation of the methods of data collection and assessments that were carried out with reference to applicable discipline or industry standards and government guidance, and any difficulties encountered when preparing the EIA.

Table 1-1 lists the competent experts who were involved in the preparation of each of the main chapters in the EIAR.

Table 1-1: EIA Team Competencies

Role / Technical Discipline	Name / Company	Experience (Years)	Professional Qualifications & Affiliations
Project Manager	Barry Dunphy, Associate, Nicholas O'Dwyer Ltd.	20+ years	BE, MSc, DIC, MIEI
EIA Coordinator Non-Technical Summary Population and Human Health Impact Interactions Summary of Environmental Commitments	Laurie McGee, Senior Environmental Consultant and Chartered Town Planner, Nicholas O' Dwyer Ltd.	20+ years	BA, MA, MIPI, MRTPI
Biodiversity	Nick Marchant, NM Ecology Ltd.	12 years	BSc MSc, MCIEEM
Hydrology & Geomorphology	Barry Dunphy, Associate, Nicholas O'Dwyer Ltd.	20+ years	BE, MSc, DIC, MIEI
Soils, Geology and Hydrogeology	Richard Church, formerly Nicholas O'Dwyer Ltd.	20+ years	BSc, MSc
Landscape and Visual (incl LVIA, landscape mitigation plans, tree survey and photomontages)	Evelyn Sikora, Senior Landscape Architect, Cunnane Stratton Reynolds Ltd. Declan O'Leary, Managing Director, Cunnane Stratton Reynolds Ltd. Keith Mitchell, Director, Cunnane Stratton Reynolds Ltd.	5+ years 25+years 23 years	BA, MA, MILI MILI MILI, CMLI

Role / Technical Discipline	Name / Company	Experience (Years)	Professional Qualifications & Affiliations
	Chris Shackleton, Chris Shackleton Consulting	30+ years	BA BAI MIEI FIS
Archaeology and Cultural Heritage	Faith Bailey, Associate Director, Senior Archaeologist & Cultural Heritage Consultant, IAC Ltd.	15+ years	MA, BA (Hons), MCIfA
Noise and Vibration Air Quality and Climate	Mervyn Keegan, Director, AONA Environmental Consulting Ltd.	20+ years	BSc, MSc
Traffic and Transport Material Assets	Graham Young, Nicholas O'Dwyer Ltd.	23+ years	CEng, Dip. PM, BA BAI

In addition to the main contributors to the EIAR, information was sought from relevant stakeholders in an EIA scoping consultation. The findings from the scoping process are presented in **Chapter 3** of this EIAR.

1.8 Presentation of the EIAR

The EIAR is presented in the format set out in the EPA's *"Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports"* (August 2017).[4] It is in four Volumes under separate cover as follows:

Volume 1 - Non-Technical Summary provides an outline of the proposed development and highlighting the key impacts and mitigation measures in non-technical language, is available as a separate document.

Volume 2 - Main Report of the EIAR, this Volume, is divided into three parts. Each part is sub-divided into chapters.

- **Part I** – provides General Information and comprises five chapters:
  - **Chapter 1** provides the background to the project, a description of the site location and overview of and proposed development, the project promoters, requirement for the production of an EIAR, the structure of the EIAR, the competent experts who contributed to the EIAR, and the difficulties in compiling specific information for the EIAR.

[4] Environmental Protection Agency, Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, Draft August 2017, https://www.epa.ie/pubs/advice/ea/EPA%20EIAR%20Guidelines.pdf, [accessed 04/09/19].

- **Chapter 2** describes the planning policy context at EU, national, regional and local level.

- **Chapter 3** details the extent of consultation that was carried out during the course of the EIA and project design, including with state agencies and other bodies at scoping stage, and engagement with the public, elected members and officials of the local Councils.

- **Chapter 4** presents some background that establishes the need for the project, and describes the alternatives considered for the proposed development, and how the final design was determined.

- **Chapter 5** provides a detailed description of the proposed development including methods of construction. It also sets out the general mitigation and control measures that will be employed to reduce the impacts of the project during the construction and operation phase.

- **Part II** – Assessment of Environmental Effects and Proposed Mitigation Measures contains twelve chapters.

  - **Chapters 6 to 15** present the results of the assessment for each environmental aspect and the interactions between individual aspects. Each of these chapters is sub-divided into a series of sub-sections *i.e.* introduction, methodology, existing environment, predicted impacts, mitigation measures, and residual impacts.

  - **Chapters 16 and 17** provide an examination of environmental impact interactions and a schedule of mitigation measures, representing the environmental commitments for the project.

- **Part III** comprises two chapters (**Chapters 18** and **19**) on references, abbreviations and a glossary of terms.

Volume 3 - Figures and Photomontages that support the EIAR and Planning Application.

Volume 4 - Appendices which provide technical data and survey reports to support the EIAR.

2 PLANNING POLICY CONTEXT

2.1 Introduction

This section sets out the relevant legislation, policy and guidance at EU, national, regional and local levels to be considered for the proposals.

2.2 European Legislation

2.2.1 EU Floods Directive

The principal EU legislation relevant to the development is the EU Floods Directive (2007/60/EC) (Directive on the Assessment and Management of Flood Risks) which seeks to reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity. The Directive also sets out the framework for the assessment and management of flood risks and the specific obligations each member state must implement. These include:

- Preliminary Flood Risk Assessment (PFRA) to identify areas of potentially significant flood risk based on available or readily derivable information;
- Flood hazard and risk maps for the areas identified under the PFRA; and
- Flood Risk Management Plans (FRMPs) at a catchment or river basin scale, setting out measures aimed at achieving objectives for the management of flood risks within the areas identified under the PFRA.

See discussion on Ireland's National Flood Policy and the National Catchment Flood Risk Assessment and Management Programme in **Section 2.4.3**.

2.2.2 EU Water Framework Directive

The EU Water Framework Directive (WFD) (2000/60/EC) establishes a framework for the protection of all waters including rivers, lakes, estuaries, coastal waters and groundwater and their dependent wildlife/habitats under one piece of environmental legislation. Specifically, the WFD aims to:

- protect and where necessary to improve the quality of all our inland and coastal waters, groundwater and associated wetlands and to prevent their further deterioration;
- achieve 'good status' for all these waters by December 2015;
- promote the sustainable use of water;
- manage water bodies based on river basins or catchments; and
- involve the public.

The EU promotes a common implementation strategy for the Floods Directive and the WFD to promote integrated river basin management. Both Directives require involvement of

communities in the formulation of river basin management plans and giving the public access to information.

2.3 EU Habitats Directive

The EU Habitats Directive (92/43/EEC) provides the framework for legal protection for habitats and species of European conservation significance. The Directive provides the legislative means to establish a network of sites (known as the Natura 2000 network) throughout the EU with the objective of conserving habitats and species deemed to be of community interest. These sites include Special Area of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas (SPAs) designated under the Birds Directive.

The EU Habitats Directive was transposed into Irish legislation through the European Union (Natural Habitats) Regulations, S.I. No. 94 of 1997. These Regulations were amended by S.I. No. 233 of 1998 and S.I. No. 378 of 2005. 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 Court of Justice of the European Union (CJEU) judgments.

Article 6, paragraphs 3 and 4 of the EU Habitats Directive requires that: *"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public."*

Article 42 (7) of the *European Communities (Birds and Natural Habitats) Regulations 2011* states that: *"The public authority shall determine that an Appropriate Assessment of a plan or project is not required* […] *if it can be excluded on the basis of objective scientific information following screening under this Regulation, that the plan or project, individually or in combination with other plans or projects, will have a significant effect on a European site."*

2.3.1 Natura Impact Statement

The Habitats Directive (Council Directive 92/43/EEC) requires that plans and projects must be screened for the likelihood of significant effects on European Sites *i.e*. Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

NM Ecology Ltd. prepared an Appropriate Assessment (AA) Screening Report for the project to determine the likely significant effects, if any, of the proposed development on European Sites. The screening process concluded that it cannot be excluded, on the basis of objective information, that the proposed development, individually or in combination with other plans or projects, will have a significant effect on European sites, namely the North Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka Estuary

SPA and North Bull Island SPA. Accordingly, it was concluded that an AA of the proposed development was required.

A Natura Impact Statement (NIS) of the proposed Poddle River Flood Alleviation Scheme was subsequently prepared by NM Ecology Ltd. The NIS provides information to assist the competent authority, An Bord Pleanála, in undertaking an AA of the proposed development.

North Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka Estuary SPA and North Bull Island SPA all have distant hydrological connections to the proposed development site. In a worst-case scenario there is a risk of adverse effects on the integrity of one or more European sites. In response, a series of hydrological mitigation measures have been recommended, which will be effective in avoiding and/or removing risks of adverse effects on the integrity of the above-mentioned European sites.

The NIS concludes that the proposed development will not adversely affect the integrity of any European site, either alone or in-combination with other plans or projects, once the mitigation as detailed in the NIS are implemented in full and that the competent authority will not need to proceed past Stage 2 of the AA process. Refer to **Part 4** of the Planning Documentation for a copy of the NIS.

2.4 National Legislation, Policy and Guidance

2.4.1 European Communities (Assessment and Management of Flood Risks) Regulations 2010 and 2015

The EU Floods Directive (2007/60/EC) was transposed into Irish law through the European Communities (Assessment and Management of Flood Risks) Regulations (S.I. No. 122 of 2010 as amended by S.I. 495 of 2015). The Regulations appoint the Office of Public Works (OPW) in Ireland as the Competent Authority under the Directive. The OPW has lead responsibility for devising and implementing measures to deal with flooding in Ireland. In the legislation, other agencies such as local authorities, Waterways Ireland, ESB and Irish Water are assigned certain duties regarding flood risk within their areas of responsibility.

2.4.2 Arterial Drainage Act (1945) and Arterial Drainage (Amendment) Act 1995

The Arterial Drainage Act, 1945 (S.I. No. 3 of 1945) is the primary piece of legislation with which the OPW have been operating under for the last 70 years. The Act empowers the OPW to undertake catchment wide arterial drainage schemes to reduce flooding with a primary emphasis on the improvement of agricultural land. The Act was amended in 1995 by the Arterial Drainage (Amendment) Act, 1995 (S.I. No. 14 of 1995) which empowered the OPW to undertake localised flood relief schemes to protect and reduce flood risk in individual urban areas.

2.4.3 National Flood Policy (2004)

In line with internationally changing perspectives, the Government adopted a new policy in 2004 that shifted the emphasis in addressing flood risk towards:

- A catchment-based context for managing risk.

- Pro-active flood hazard and risk assessment and management, with a view to avoiding or minimising future increases in risk, such as that which might arise from development in floodplains.

- Increased use of non-structural and flood impact mitigation measures.

The flood risk management plans of the national Catchment Flood Risk Assessment and Management (CFRAM) provides a detailed assessment of adaptation for flood risk management measures in a particular location.

2.4.4 CFRAM Programme

The CFRAM programme seeks to deliver the National Flood Policy, adopted in 2004, and the requirements of the EU Floods Directive. Flood Risk Management Plans (FRMPs) set out recommendations for the management of flood risk in a catchment-based plan area. The FRMPs assess the potential for significant increases in flood risk due to climate change, ongoing development and other pressures that may arise in the future and make recommendations for the management of existing flood risk and preventing future flooding.

The Eastern CFRAM Flood Risk Review[5] (December 2011) confirmed Areas for Further Assessment (AFA) based on information from past flood events, OPW and local authority staff knowledge of probable flood risk areas, and analysis of flood hazard information including flood extent mapping and flood risk receptor vulnerability. AFAs are areas where potential significant flood risk exists or might be considered likely to exist. The Eastern CFRAM Flood Risk Review identified the River Poddle as a sub-catchment within the Dublin City AFA.

2.4.4.1 Poddle Options Report

Arising from the Eastern CFRAM Flood Risk Review, an Options Report was prepared for the River Poddle sub-catchment in 2013 - 2014[6]. This Report records the activities that were undertaken to determine flood risk management options for the catchment which included topographical survey of the river channel and floodplain, hydrological analysis, hydraulic modelling, and flood risk assessment to assess and make the existing and future flood risk with a focus on the social, environmental, cultural heritage and economic receptors at risk of flooding. Flood risk management options were assessed against set criteria and scored in an optioneering process which included benefit-cost ratios. The possible options were then subject to consultation with elected members, stakeholders and the public to arrive at the preferred options. The hydraulic modelling was subject to a further technical review arising from the information obtained from stakeholders and the public.

The Poddle Options Report identifies a preferred option of hard defences, sealing manholes and upstream storage (Option 2) with a recommendation to further consider flow diversion

[5] Eastern CFRAM Study Flood Risk Review – Final Report, RPS Group, December 2011, https://bit.ly/2XAAdAI, [accessed 23/04/19].

[6] Eastern CFRAM Study Poddle Options Report, RPS Group, July 2014, https://bit.ly/2GF1P29, [accessed 23/04/19].

to the River Dodder (Option 3). **Chapter 3** of this EIAR summarises the options considered and further tested in the process of designing the proposed Flood Alleviation Scheme.

A website www.floodinfo.ie provides a map based resource covering the 29 flood risk management plans that are underway or have recently been approved for funding. The "*River Poddle Flood Protection Project*" is identified as an existing measure in the Flood Risk Management Plan for Liffey & Dublin Bay, 2018[7] and is funded under the Flood Protection Capital Programme 2016 – 2021.

2.4.5 National Adaptation Framework (January 2018)

Ireland's National Adaptation Framework (NAF), Planning for a Climate Resilient Ireland[8], was drawn up in accordance with the Climate Action and Low Carbon Development Act (S.I. No. 46 of 2015). Adaptations are measures undertaken to address current and future risks posed by climate change, the aim of which is to reduce the vulnerability of our environment, society and economy to climate change and increase resilience.

Regional climate model simulations were carried out for the Environmental Protection Agency for the period 1981 – 2000 and future 2041 – 2060 to predict the local effects of climate change in Ireland by 2050.[9] Projections from the model simulations that relate to the River Poddle Flood Alleviation Scheme include:

- significant projected decreases in mean annual, spring and summer precipitation amounts, and an increase in heavy rainfall events in winter and autumn;
- a decrease in frequency but an increase in intensity of storms; and
- intensification of the hydrologic cycle leading to increased incidence of high and low flow periods.

The NAF sets the context to ensure mitigation and adaptation are mainstreamed into local, regional and national planning and policy making, and will be reviewed every five years. Under the NAF, sectors and lead Government departments, as well as local authorities, are required to prepare statutory sectoral adaptation plans. Guidelines for preparation of these adaptation plans have been published by the Department of Communications, Climate Action & Environment.[10] Under the NAF, Water Resource and Flood Risk Management are within the remit of OPW.

[7] Flood Risk Management Plan for Liffey & Dublin Bay, OPW, 2018, https://bit.ly/2UQL2Sp, [accessed 23/04/19].

[8] National Adaptation Framework, Planning for a Climate Resilient Ireland, Department of Communications, Climate Action and the Environment, January 2018 https://bit.ly/2PjauIs, [accessed 23/04/19].

[9] "Ensemble of regional climate model projections for Ireland", Paul Nolan, prepared for the Environmental Protection Agency, Research Report No. 159, 2015 https://bit.ly/2nm8F2d, [accessed 23/04/19].

[10] Sectoral Planning Guidelines for Climate Change Adaptation, Department of Communications, Climate Action & Environment, May 2018, https://bit.ly/2Yk54Bq, [accessed 26/07/19].

2.4.6 Office of Public Works Climate Change Sectoral Adaptation Plan Flood Risk Management (2015 – 2019)

This document is the current adaptation plan of the OPW and predates the NAF.[11] It is high-level and sets out the approach and framework for climate change adaptation of the OPW based on a current understanding of the potential consequences of climate change for flooding and flood risk in Ireland, and the adaptation actions to be implemented.

2.4.7 Local Authority Adaptation Strategy Development Guidelines (December 2018)

These statutory guidelines describe the planning cycle to be followed by local authorities in developing adaptation strategies, and the resources available from the Department to prepare them.[12] Following on from these Guidelines, the four Dublin local authorities, DCC, Dún Laoghaire-Rathdown County Council, Fingal County Council and SDCC have each prepared Climate Change Action Plans for the period 2019 – 2024.[13] Flood resilience and nature-based solutions is one of the action areas in the plans.

2.4.8 Climate Change Action Plans (2019)

Both SDCC's and DCC's Climate Change Action Plans list the Poddle Flood Alleviation Scheme as a flood defence action that is currently ongoing. The multiple actions that are currently budgeted in both Councils which are applicable to the proposed Poddle Flood Alleviation Scheme are cross boundary flood management working in conjunction with neighbouring local authorities and the OPW, and tree planting for water attenuation and integrated constructed wetlands for water attenuation and purification. For nature-based solutions, the plans see the role of trees green infrastructure, particularly in public open spaces and parks, in climate change mitigation and adaptation.

2.4.9 Planning System and Flood Risk Management – Guidelines for Local Authorities (November 2009)

The core objectives of these Guidelines are:

- Avoiding inappropriate development in areas at risk of flooding;
- Avoiding new developments increasing flood risk elsewhere, including that which may arise from surface water run-off;
- Ensuring effective management of residual risks for development permitted in floodplains;

[11] Draft for Consultation, Climate Change Sectoral Adaptation Plan, Flood Risk Management (2015 - 2019), Office of Public Works, May 2015, https://bit.ly/2SDucSo, [accessed 26/07/19].

[12] Local Authority Adaptation Strategy Guidelines, Department of Communications, Climate Action & Environment, December 2018, https://bit.ly/2LJ10sy, [accessed 26/07/19].

[13] Dublin Climate Change Action Plans, May 2019, https://bit.ly/2kjQvjC, [accessed 26/07/19].

- Avoiding unnecessary restriction of national, regional or local economic and social growth;
- Improving the understanding of flood risk among relevant stakeholders; and
- Ensuring that the requirements of EU and national law in relation to the natural environment and nature conservation are complied with at all stages of flood risk management.

The Guidelines recommend that Flood Risk Assessments (FRA) are carried out to identify the risk of flooding to land, property and people at different scales by government organisations, local authorities and in respect of planning for development appropriate to the level of information required to implement the core objectives of the Guidelines.

2.4.9.1 Circular PL 2/2014

This Circular addresses the use of OPW flood mapping in assessing planning applications and makes four amendments to the Flood Risk Management Guidelines to give further advice and detail to planning authorities in relation to vulnerable uses in flood zones A & B for development plans.

2.4.10 National Planning Framework

The National Planning Framework (NPF), published in February 2018, is the Government's high-level strategic plan for shaping the future growth and development of Ireland to the year 2040. The NPF is a region-focused strategy for managing growth, using state lands for certain strategic purposes and supporting this with strengthened, more environmentally focused planning at local level. The NPF is given effect with a 10-year capital investment programme in the National Development Plan 2018 – 2027 (NDP).

2.4.10.1 National Flood Risk Appraisal

In line with the planning system and Flood Risk Management Guidelines, a high-level flood risk appraisal was carried out for the draft NPF[14]. It applied the Guidelines to the NPF in accordance with the sequential approach. It identified high level risk and spatial planning issues for the country and set out a policy framework for local authority development plans to address the flood risk issues identified at regional level.

The Flood Risk Appraisal states that Dublin City is constrained by the fact that it is already fully developed, and that the principle of avoidance is difficult adjacent to rivers such as the Poddle where there is not always flood free land to develop on. The targets for population growth and economic development in the NPF will require the expansion of existing urban areas. The application of the Guidelines and the sequential approach will ensure sustainable development by avoiding areas of high flood risk or in exception fully justifying why development must proceed and ensuring adequate mitigation is in place.

[14] Strategic Flood Risk Assessment Report, Ireland 2040: The National Planning Framework, RPS Group, September 2017 https://bit.ly/2Gs24Mn, [accessed 24/03/19].

2.5 Regional Planning Context

2.5.1 Eastern & Midland Regional Spatial and Economic Strategy

The Eastern & Midland Regional Authority (EMRA) recently adopted the Regional Spatial Economic Strategy (RSES). This encompasses Dublin and surrounding counties and replaces the Greater Dublin Area Regional Planning Guidelines.

The principal statutory purpose of the RSES is to support the implementation of the NPF and NDP and the economic policies and objectives of the Government by providing a long-term strategic planning and economic framework for development of the Regions.

The EMRA RSES sets out 16 regional strategic outcomes in line with the National Strategic Outcomes of the NPF. The River Poddle Flood Alleviation Scheme is aligned with the regional strategic outcomes on Climate Action, namely sustainable management of water, waste and other environmental resources, building climate resistance, and enhanced green infrastructure.

The Regional Policy Objectives (RPO) related to Flooding are:

- **RPO 7.12:** *Future statutory landuse plans shall include Strategic Flood Risk Assessment (SFRA) and seek to avoid inappropriate land use zonings and development in areas at risk of flooding and to integrate sustainable water management solutions (such as SUDS, nonporous surfacing and green roofs) to create safe places in accordance with the Planning System and Flood Risk Assessment Guidelines for Local Authorities.*

- **RPO 7.13:** *EMRA will work with Local Authorities, the OPW and other relevant Departments and agencies to implement the recommendations of the CFRAM programme to ensure that flood risk management policies and infrastructure are progressively implemented.*

- **RPO 7.14:** *Local Authorities shall take account of and incorporate into the development of local planning policy and decision making the recommendations of the Flood Risk Management Plans (FRMPs), including planned investment measures for managing and reducing flood risk.*

- **RPO 7.15:** *Local Authorities shall take opportunities to enhance biodiversity and amenities and to ensure the protection of environmentally sensitive sites and habitats, including where flood risk management measures are planned.*

2.5.1.1 Green Infrastructure

The River Poddle is listed among the Strategic Natural, Cultural and Green Infrastructure Assets in the Region, as listed in Table 7.1 of the RSES. Green Infrastructure is a term that is used in the RSES to refer to as a *"strategically planned network of high quality natural and semi-natural areas with other environmental features, which is designed and managed to deliver a wide range of ecosystem services and protect biodiversity in both rural and urban settings".* The ecosystem services that can be provided by green infrastructure include recreation, pollination, coastal protection, microclimate regulation, air quality, noise reduction, carbon sequestration, flood protection and water quality.

The River Poddle Flood Alleviation Scheme provides enhanced biodiversity and amenities and ensures the protection of environmentally sensitive sites; and delivers ecosystem services including pollination, flood protection and water quality, in line with the RSES.

2.5.1.2 Regional Flood Risk Appraisal

The suite of documents in the EMRA Draft RSES included a Regional Flood Risk Assessment as required by the Flood Risk Management Guidelines. The River Poddle Flood Alleviation Scheme is listed in the Draft RSES document as a project which will continue to be progressed.

2.6 Local Planning Context

The working areas in the proposed Poddle River Flood Alleviation project is in an urban / suburban setting in the south-west of Dublin City in the administrative areas of SDCC and DCC. The Poddle River passes through areas of industrial, commercial, residential and open space/recreational uses. Much of the area in the vicinity of the proposed works is urban and well developed.

The planning policies and objectives relevant to the proposed project in the development plans for South Dublin County and Dublin City local authorities is described below.

2.6.1 South Dublin County Development Plan 2016-2022

The Core Strategy of the South Dublin County Development Plan 2016 – 2022 (CDP) has two key policies that are relevant to the proposed Flood Alleviation Scheme. These relate to flood risk management and climate change.

2.6.1.1 Core Strategy

- **Policy 3: Flood Risk:** *To continue to incorporate Flood Risk Management into the spatial planning of the County to meet the requirements of the EU Floods Directive and the EU Water Framework Directive.*

- **Policy 8: National Climate Change Strategy:** *It is the policy of the Council to support the implementation of the National Climate Change Strategy and the National Climate Change Adaption Framework Building Resilience to Climate Change 2012 through the County Development Plan and through the preparation of a Climate Change Adaptation Plan in conjunction with all relevant stakeholders.*

Relevant objectives in relation to flood risk are contained in objectives of the **Infrastructure & Environmental Quality (IE) Policy 3 Flood Risk** and include:

- **IE3 Objective 1:** *To support and co-operate with the OPW in delivering the CFRAM Programme and ensuring the recommendations of the CFRAM study for the Eastern District are considered in preparing plans and assessing development proposals.*

- **IE3 Objective 2:** *To support the implementation of the EU Flood Risk Directive (2007/60/EC) and the Flood Risk Regulations (S. I. No 122 of 2010).*

- **IE3 Objective 3:** *To manage flood risk in the County in accordance with the requirements of the Flood Risk Management Guidelines for Planning Authorities*

(2009) and Circular PL02/2014 (August 2014), in particular when preparing plans and programmes and assessing development proposals.

- **IE3 Objective 4:** *To support and facilitate the delivery of flood alleviation schemes in South Dublin County, including the Poddle, Ballycullen and Whitechurch Flood Alleviation Schemes.*

There are policies and objectives throughout the CDP which aim to ameliorate the effects of climate change and introduce resilience to its effects in support the implementation of the National Climate Change Strategy 2007-2012, and the National Climate Change Adaptation Framework: Building Resilience to Climate Change.

2.6.1.2 Green Infrastructure

The CDP recognises the role strategic green infrastructure plays in meeting the obligations under EU Directives and national legislation such as the Water Framework Directive, Strategic Environmental Assessment (SEA), Floods Directive and Birds and Habitats Directives. This is described in Chapter 8 of the CDP.

The CDP **Green Infrastructure (G) Overarching Policy 1** states that states "*It is the policy of the Council to protect, enhance and further develop a multifunctional Green Infrastructure network by building an interconnected network of parks, open spaces, hedgerows, grasslands, protected areas, and rivers and streams that provide a shared space for amenity and recreation, biodiversity protection, flood management and adaptation to climate change."*

The proposed River Poddle Flood Alleviation Scheme is a multi-faceted project in existing green infrastructure within SDCC area that will provide the benefits of flood management and adaptation to climate change, enhanced biodiversity, and improved water quality and in so doing meets with the above overarching policy.

The Scheme also fulfils an objective of **Green Infrastructure (G) Policy 2 Green Infrastructure Network**, **G2 Objective 2** *"To protect and enhance the biodiversity value and ecological function of the Green Infrastructure Network"* by utilising the existing lake as flood storage and creating an integrated constructed wetland. **G2 Objective 9** is another objective of this Policy which is *"To preserve, protect and augment trees, groups of trees, woodlands and hedgerows within the County by increasing tree canopy coverage using locally native species and by incorporating them within design proposals and supporting their integration into the Green Infrastructure Network."* Whilst removal of trees is unavoidable for the Scheme, careful consideration has been given by surveying works areas to ascertain tree loss, but also in identifying locations within each Council area where trees can be planted in landscape mitigation and biodiversity enhancement plans.

The Scheme must also adhere to the objectives of the **Green Infrastructure (G) Policy 3 Watercourses Network** including:

- **G3 Objective 2** *to maintain a biodiversity protection zone a minimum of 10m from the top of the bank of all rivers in the County.*

- **G3 Objective 3** *ensure the protection, improvement or restoration of riverine floodplains and to promote strategic measures to accommodate flooding at*

appropriate locations, to protect ground and surface water quality and build resilience to climate change.

- **G3 Objective 5** *provide for protection measures to watercourses and their banks, including preventing pollution of the watercourse, protecting the riverbank from erosion, and the retention and / or provision of wildlife corridors.*

In this EIAR, due consideration is given to biodiversity and protection of the riverbank and water quality, in the Scheme where work within the river corridor is unavoidable.

2.6.1.3 Community Infrastructure

Tymon Park, where the main flood storage is to be provided in the Scheme, is classified as a Regional Park in the open space hierarchy of the Council. Regional parks are a key element of the County's green infrastructure through urban areas. The Regional parks contain important features such as watercourses, SUDS features such as ponds, marshlands and meadows, woodland areas and hedgerows. The CDP recognises that there are opportunities to strengthen biodiversity corridors from these parks into the adjacent urban areas.

2.6.1.4 Strategic Flood Risk Assessment

The Strategic Flood Risk Assessment of the South Dublin County Development Plan 2016-2022, prepared in accordance with the Flood Risk Management Guidelines, refers to areas of existing highly vulnerable development in the Poddle catchment at Kimmage and Templeogue as identified in the Eastern CFRAM and points to an existing housing area at Whitehall Road where development should not be permitted until the planned flood alleviation works are completed.

2.6.1.5 Zoning designation – areas of proposed works

The works planned at Tymon Park and Whitehall Park are located within areas zoned Open Space which has as its objective in the CDP *"To preserve, provide and improve recreational amenity and open space and green networks."* The proposed works are necessary to provide flood protection to properties nearby in a 1% AEP flood event, and to provide some flood storage. The remainder of the works involve tree removal and replacement or reinforcement of existing walls for flood alleviation in areas that are zoned residential.

2.6.2 Dublin City Development Plan 2016-2022

2.6.2.1 Core strategy

Climate change adaptation and mitigation is a main pillar in the core strategy of the Dublin City Development Plan 2016 – 2022 (CDP).

Climate Change

Chapter 3 Addressing Climate Change covers climate change adaptation, of which flooding risk assessment and management is a key part, and mitigation, which refers to actions to reduce emissions of greenhouse gases that contribute to climate change. Under climate change and flood risk, the **Policy CC5** is *"To address flood risk at strategic level through the process of strategic flood risk assessment, and through improvements to the*

City's flood defences (see Appendix 11)." Appendix 11 refers to the Poddle Flood Alleviation Scheme within the River Liffey catchment.

2.6.2.2 Infrastructure

Chapter 9 Sustainable Environmental Infrastructure has planning policies relevant to the proposed project which are paraphrased below.

- **SI9:** *To assist the OPW in developing catchment-based Flood Risk Management Plans for rivers, coastlines and estuaries in the Dublin city area and have regard to their provisions/recommendations.*

- **SI10:** *To have regard to the Guidelines for Planning Authorities on the Planning System and Flood Risk Management, and Technical Appendices, November 2009, when assessing planning applications and in the preparation of plans both statutory and non-statutory.*

- **SI11:** *To put in place adequate measures to protect the integrity of the existing flood defence infrastructure in Dublin City Council's ownership and identified in the SFRA and to ensure that the new developments do not have the effect of reducing the effectiveness or integrity of any existing or new flood defence infrastructure and that flood defence infrastructure has regard also to nature conservation, open space and amenity issues.*

- **SI12:** *To implement and comply fully with the recommendations of the SFRA prepared as part of the Dublin City Development Plan.*

- **SI17:** *To require an environmental assessment of all proposed flood protection or flood alleviation works.*

Relevant objectives include:

- **SIO11:** *To work with neighbouring local authorities when developing cross-boundary flood management work programmes and when considering cross-boundary development.*

- **SIO12:** T*o ensure each flood risk management activity is examined to determine actions required to embed and provide for effective climate change adaptation as set out in the Dublin City Council climate change adaption policy and in the OPW Climate Change Sectoral Adaptation Plan Flood Risk Management applicable at the time.*

Green Infrastructure

In **Chapter 10 Green Infrastructure, Open Space & Recreation** of the CDP it is a policy of Dublin City Council the following polices are relevant to the Scheme:

- **GI4:** *To co-ordinate open space, biodiversity and flood management requirements, in progressing a green infrastructure network.*

- **GI10:** *To continue to manage and protect and/or enhance public open spaces to meet the social, recreational, conservation and ecological needs of the city and to*

consider the development of appropriate complementary facilities which do not detract from the amenities of spaces.

2.6.2.3 Strategic Flood Risk Assessment

As required by the Flood Risk Management Guidelines, a Strategic Flood Risk Assessment (SFRA) was prepared for the Dublin City Development Plan 2016 – 2022 and is contained in Volume 7 of the Plan. The SFRA assessed four sites along the Poddle River in Dublin and Harold's Cross, applying the Justification Test for development management and development planning. The SFRA states that the proposed flood alleviation works along the River Poddle provide the extra defences required in Mount Argus, St. Martin's Drive, Poddle Park and Ravensdale Park as well as storage in South Dublin County Council to provide estimated flood protection to the 100-year flood level.

2.6.2.4 Zoning designation – areas of proposed works

The works planned at Ravensdale Park are located within an area zoned Amenity/Open Space Lands/Green Network (Zone Z9) which has as its objective *"To preserve, provide and improve recreational amenity and open space and green networks."* The proposed works are necessary to provide flood storage in a 1% AEP flood event, and alleviate flooding experienced by local residents in Ravensdale. The provision of flood management is a function of open space as green infrastructure which is recognised in Chapter 10 of the Dublin City Development Plan 2016 – 2022.

The remainder of the works involve tree removal and replacement or reinforcement of existing walls for flood alleviation in areas that are zoned residential.

2.7 Trees policies

In line with SDCC's **Tree Management Policy** and DCC's **Tree Strategy 2016 - 2020**, a tree survey has been carried out at works areas of the proposed Flood Alleviation Scheme. The purpose of the tree survey was to identify the trees and their root protection areas which would be affected by the proposed works.

The findings from the tree survey assisted in preparing final landscape mitigation plans for Tymon Park and Ravensdale Park, with consideration of the landscape and visual, biodiversity and amenity impacts. The tree survey report includes an impact assessment and accompanying drawings and tables identifying quantities, species and locations of trees to be lost as a result of the Scheme. Areas for replacement tree planting within the Scheme have been identified in consultation with the respective Councils in accordance with the relevant tree policies.

2.8 Local Area Plans

There are no existing or draft local area plans in either local authority area affecting the areas of the proposed development.

2.9 Site and Surrounds Planning History

The proposed working areas are in an urban / suburban setting in the south-west of Dublin City. The catchment is fully urbanised, and given the demand for housing in Dublin, the

main pressures are from intensification of urban development through infill or redevelopment of sites.

Live and recently approved planning applications in the vicinity of the River Poddle were reviewed on the online planning register of SDCC and DCC. The following applications were considered to be relevant to the proposed development:

- An application for 7 no. houses was submitted at the Terenure Badminton Club on Whitehall Rd. in 2018 (planning reference SD18A/0360) but was 'deemed withdrawn' by SDCC following the expiration of a request for further information.

- A Part VIII Application was made in 2016 for the construction of a new library beside Castletymon Road (planning reference SD168/0003) adjacent to the River Poddle. An Appropriate Assessment screening report was included in the documentation, and it was concluded that there was no risk of likely significant impacts on any European sites. Construction of this project commenced in January 2019 and is expected to be completed in January 2020.

- Permission was granted in 2016 for an extension to the Scoil Aonghusa Senior National School at Balrothery (SD16A/0257), although most construction would be more than 100 m from the river. This extension was completed in December 2017. There is a recent approval for a single storey temporary prefab classroom adjacent to the southeast boundary of the site and associated site works (SD19A/0289).

- A large residential development has been under construction for several years in the grounds of Mount Argus Church on Kimmage Road Lower and may continue in 2020. It is in close proximity to the River Poddle.

- There is a current planning application for demolition of an office building and development of a 12 no. units apartment building at a site located at Unit 1, KCR Estate in Ravensdale Park (3193/19).

- There is a site on the Vacant Sites Register of DCC in close proximity to the River Poddle located at the side of Riverpark House, in Poddle Park, Kimmage (VS-0751). Being on the Vacant Sites Register, this site is likely to be brought forward for residential development. Under the Urban Regeneration and Housing Act 2015, a levy is payable until such time as it is developed for housing. There are no sites in proximity to the River Poddle on the Vacant Site Register of SDCC.

All other planning applications in the surrounding area were for small-scale works such as extensions to residential properties and leisure and recreation developments.

3 SCOPING AND CONSULTATIONS

3.1 Introduction

Consultation is an important element of the design process. The objective of consultation is to ensure that the views and concerns of all stakeholders are taken into account and that information relevant to the project is made known and available.

This chapter of the EIAR records the consultations with stakeholders, elected members and the public that have been carried out to date in respect of the proposed development. There will be an opportunity for interested parties to comment on the proposals in the Flood Alleviation Scheme within the period and procedures allowed by statute once an application for planning permission is submitted to An Bord Pleanála.

3.2 EIA Scoping

Nicholas O' Dwyer Ltd. prepared an EIA Scoping Report describing the nature of the proposed development, the need for the project, and for each EIA technical discipline the baseline environment, potential effects during construction and operation, and proposed assessment methodology.

On 4th February 2019, Nicholas O' Dwyer Ltd., on behalf of SDCC and DCC, circulated the EIA Scoping Report with a request for any relevant information and an opinion from statutory consultees and other agencies and organisations on the scope of the EIAR. The following organisations were consulted:

- An Taisce – The National Trust for Ireland;
- Department of Arts, Heritage and the Gaeltacht;
- Department of Housing, Planning and Local Government;
- Department of Communications, Climate Action and the Environment;
- Department of Jobs, Enterprise and Innovation;
- Environmental Protection Agency;
- National Road Authority, Transport Infrastructure Ireland;
- National Transport Authority;
- Inland Fisheries Ireland;
- The Heritage Council;
- Arts Council;
- Health Services Executive;
- Bord Gáis;
- ESB;

- Fáilte Ireland;
- Irish Environmental Network;
- Birdwatch Ireland;
- IBEC; and the
- Dublin Chamber of Commerce.

A summary of the comments and recommendations received from the agencies and organisations and how they have been taken into account in the EIA and design of the project are described in **Table 3-1**. A copy of responses received is contained in **EIAR Volume 4, Appendix 3.1**.

Table 3-1: Summary of Scoping Responses

Consultee	Summary of Submission	Response to Submission
Department of Arts, Heritage and the Gaeltacht	Brent Geese were present again this winter. This is relevant also to the Appropriate Assessment since Brent Geese are qualifying interests for both Bull Island SPA and South Dublin Bay and Tolka Estuary SPA.	As stated in Section 3.4 of the NIS, amenity grasslands in parks and sports fields in the City and surrounding areas are feeding grounds for brent geese and other overwintering birds. Tymon Park was an important feeding area for brent geese in the past, but it now appears to be used very infrequently. This is almost certainly due to disturbance from dogs (*e.g.* in the dog enclosure in the north-west of the park), which typically cause geese to take flight at distances of several hundred metres. Therefore, Tymon Park is no longer considered to be an important feeding area for brent geese. See EIAR **Chapter 7, Section 7.4**. As further stated in Section 3.4 of the NIS, brent geese are among the 12 species which have stable or increasing populations in the coastal Special Protection Areas in Dublin Bay.
Department of Housing, Planning and Local Government	As a consequence of amendments made to Section 30 of the Planning and Development Act, 2000, the Minister, and by extension his Department, may not, except in	n/a

Consultee	Summary of Submission	Response to Submission
	particular circumstances set out in the legislation, comment on developments or development proposals with which a planning authority or An Bord Pleanála is or may be concerned. Referred the correspondence to the Minister for Culture, Heritage and the Gaeltacht is the relevant statutory consultee for individual development proposals and subsequent applications.	
Department of Communications, Climate Action and the Environment, Geological Survey of Ireland	Refers to resources online from the agency for compilation of the Hydrology, Hydrogeology, Geomorphology, and Land, Soils and Geology sections of the EIAR. Notes that there are two geological sites on the register of sites of geological interest: the River Poddle (Geomorph theme) and Greenhills Esker (Quarternary theme). Works do not appear to impact on the integrity of the County Geological Sites. There are areas of high and extreme groundwater vulnerability in the areas of works. Refers to online mapping.	This is addressed in EIAR **Chapter 8 Hydrology and Geomorphology** and **Chapter 9 Soils, Geology and Hydrogeology**.
Environmental Protection Agency	The Environmental Licencing Programme does not respond to correspondence received by the Agency for non-licensable developments which include: • Flood relief schemes • Roads • Electricity transmission lines • Solar energy farms • Wind farms • Hydrometric stations • Housing developments	n/a

Consultee	Summary of Submission	Response to Submission
	• General developments	
Transport Infrastructure Ireland	Noting works may potentially be proximate to the Luas Red line Tallaght stop and the Cross City line Westmoreland Street stop are near the outfall. For any works which may affect the light rail and or national road network the developer should have regard to *inter alia,* • DoECLG Spatial Planning and National Roads Guidelines (2012). The EIAR should identify the methods/techniques proposed for any works traversing/in the national road network in order to demonstrate that the development can proceed complementary to safeguarding the capacity, safety and operational efficiency of the network. • Clearly identify haul routes proposed and fully assess the national road network and light rail to be traversed. Separate structure approvals/permits and other licences may be required in connection with the proposed haul route and all structures on the haul route should be checked by the applicant/developer to confirm their capacity to accommodate any abnormal load proposed. • Any works adjacent or interfacing with Luas infrastructure shall have regard to TII's 'Code of engineering practice for works on, near, or adjacent the Luas light rail system' available at	There are no works proposed in the River Poddle Flood Alleviation Scheme in Dublin City Centre. The river is underground from Harold's Cross through the City centre and out to the Liffey at Wellington Quay. None of the proposed works affect the light rail network or national road network. EIAR **Chapter 14 Traffic and Transport** presents an assessment of the potential effects of the proposals on the local and regional road network. Some traffic delays and disruptions will be inevitable as lorries carrying materials for construction of the embankments, and machinery for excavations in the proposed works areas are transported along public roads. These delays will be temporary for the duration of the construction works. No abnormal loads are envisaged.

Consultee	Summary of Submission	Response to Submission
	https://www.luas.ie/work-safety-permits.html. The above list is non-exhaustive, thus site and development specific issues should be addressed in accordance with best practice.	
Inland Fisheries Ireland (IFI)	Whilst the Poddle is not a salmonid river, the biodiversity assessments should provide a baseline of fish species for the stream. There may be fish in the Tymon ponds but IFI have no data to substantiate this. Indicate whether there will be any interference with the existing ponds other than adding additional ponds and embankments. Best practice and construction methodologies will be paramount on this Scheme. IFI would like to see detail on the works required on existing culverts, the methodology for the construction of the walls, access locations for plant hire, temporary stream crossings if required, locations for stockpiling of material, *etc*.	Mitigation measures to avoid potential impacts of pollution incidents in Section EIAR **Chapter 7 Biodiversity, Section 7.6**. An Outline Construction Environmental Management Plan is provided in **EIAR Volume 4, Appendix 5.1** of the EIAR. This describes the methods of construction of the Scheme and the best practice measures that will be in place to mitigate the temporary impacts during construction in relation to the prevention of pollution to ground and surface waters, noise and vibration, and traffic, The planning drawings submitted with the application (**Part 2** of Planning Documentation) show the locations for all the works associated with the proposals including temporary compounds, stockpiling of materials and storage of equipment, and typical details for walls and embankments and other features including landscape mitigation proposals.

3.3 Additional Stakeholder Consultations

3.3.1 Inland Fisheries Ireland

The consultants had a meeting with Ms. Gretta Hannigan of IFI, facilitated by SDCC, on 25th March 2019. Prior to this meeting Ms. Hannigan was briefed on the project including the proposals for channel diversions and the plan to provide flood storage at Tymon Lake.

While recognising that this is not a salmonid stream, Ms. Hannigan requested a fish diversity survey by electrofishing at locations which would potentially include Tymon North, at Tymon Lake, and at the proposed channel diversions. Regarding specific proposals for channel re-alignments and tree removal, Ms. Hannigan stated they have no

issue with the re-alignments to the channel and would prefer to avoid straight lines, and that trees are removed on only side of the river bank to mitigate potential for temperature changes in the water.

Apart from best practice measures for pollution control and construction methodologies for instream works proposed as raised in her email response to scoping, Ms. Hannigan also mentioned biosecurity in relation to importation of materials to create embankments, testing of material for invasive plants at origin site, movement of plant and machinery, on site storage of materials, and temporary crossings.

Subsequently, on 25th April 2019, through a communication with officials from SDCC, Ms. Hannigan withdrew the requirement to carry out fish diversity surveys.

3.3.2 Local Authority Officials

Throughout the course of the EIA and project design, the project team have worked closely with Council officials from the Steering Group and consulted with officers of SDCC and DCC. The Councils facilitated meetings and site visits for the project teams and Council officials and provided information and responded to queries. The issues and queries raised by officials concerned biodiversity, landscape and visual impact assessment, trees, and the public realm, especially in the areas where more substantial works are planned to provide flood storage in the Scheme.

This positive engagement has resulted in a Scheme which incorporates measures through improved design and mitigation at the construction and operational phase to enhance habitats for wildlife, to ensure safe and secure public access in recreation areas and public open space, and to minimise the impact of landscape changes from the Scheme on the visual amenity of the public and residents living near the works proposed for the Scheme.

3.4 Community Engagement

This section describes the community engagement that was held at the early stages of the project, and how the information received, and issues raised by attendees at Public Information events and through other channels were taken into consideration. Detail on attendances at each of the Public Information with a summary of the issues raised is presented below.

3.4.1 Communication Strategy

A project website was launched on 24th October 2018, www.poddlefas.ie. This website contains project information and provides updates as they become available. This website will also be a means of communicating with the public once the application is submitted to the Board, and as the project progresses through planning and during the construction phase. A project email address is set up info@poddlefas.ie where interested parties can send submissions and request information. In all cases emails will be responded to or directed to relevant persons in SDCC or DCC.

3.4.2 Public Information Events

At the early stage, four Public Information sessions on the River Poddle Flood Alleviation Scheme were held in the day and evening at local venues in each Council area on two

dates, Monday 3rd and Tuesday 4th December 2018. Two further sessions were held on 16th and 20th January 2020.

Interested stakeholders, elected representatives and the general public were invited to attend *via* a memorandum which was circulated which described the project, along with maps and plans showing the location of proposed flood alleviation works and providing illustrations on the earthen berms planned for the ponds in Tymon Park.

At the consultation events a presentation was made, maps and plans were on display and members of the Project Team were on hand to answer questions and receive further information on the project.

3.4.2.1 Recorded attendances

Recorded attendances at each of the 2018 and 2020 events are given in **Table 3-2**.

Table 3-2: Consultation Event Attendances

Event	Date	Number of Attendees
Stage 1 Public Information events		
Dublin City Council Civic Offices	03/12/18	12
Mt. Argus Parish Centre	03/12/18	17
South Dublin County Council Offices	04/12/18	2
Pavillion, Tymon Park	04/12/18	8
Stage 2 Public Information events		
Mt. Argus Parish Centre	16/01/20	52
Pavillion, Tymon Park	20/01/20	19
Councillors/TDs attending public events	Joan Collins TD Mary Freehill (DCC) Pamela Kearns (SDCC) Carly Bailey (SDCC)	

3.4.2.2 Issues raised

At the Public Information events, the overall sentiment was positive for the Scheme. Concerns centred on current development (Mount Argus), planned development (Templeogue Badminton Club), maintenance of channels, weir control at Tymon, and surface water drainage issues (Mount Argus Road), defence extents at

Grosvenor/Wainsfort Manor, changes in access, and the loss of trees and impact on habitats. Noted feedback was that more information should be provided on the Scheme, the alternatives considered, and the benefits, and that more notice of such events would be welcome.

3.4.3 Consultation with Property Owners, Residents and Park Users

Some of the works in the proposed River Poddle Flood Alleviation Scheme will be on or require access to private property. It is the intention of the Councils to undertake the works in private property by way of agreement with each affected property owner. In the event that agreement with a property owner is not possible, the relevant Councils may seek to use their powers of entry onto lands under Section 4 of the Local Authorities Works Act, 1949. It is noted that the consent of landowners and the use of powers of entry onto lands required for the Scheme is a separate process to and therefore not required for an application for approval of the proposed development under Sections 175 and 177AE of the Planning and Development Act, 2000, as amended.

In mid-December 2019, SDCC sent letters to properties that will be directly affected by the proposed Scheme, as well as to those properties in the vicinity of the works which may experience potential disruption and disturbance. Letters were also circulated to Tymon Park user groups informing them of the proposals and possible disruptions to use of the Park whilst construction is ongoing. Specific details on the proposals were provided with the letters to the properties directly affected by the proposed Scheme and in all cases the recipients were invited to contact the SDCC Resident Engineer for further information. Samples of the letters sent are provided in **EIAR Volume 4, Appendix 3.2**. SDCC has a record of all property addresses and individuals/groups to which letters were sent.

3.4.4 Engaging with Communities Affected

In June 2018 the consultants held a separate meeting with representatives from the Recorders Residents Association who provided valuable information on historical flooding events including photographs and copies of correspondence, noting observations of flooding and highlighting the issues faced by residents from flooding.

SDCC's Resident Engineer held meetings in the summer and autumn of 2018 with individuals whose properties were affected by the 2011 flood, and with Mount Jerome Cemetery and the Harold's Cross Flood Committee. Additional consultations were held in October 2019 with the owner of the laneway at the rear of Fortfield Road, and residents of Wainsfort Manor Green and Whitehall Road, and at St. Martin's Drive EGM on the 29th January 2020.

In early November 2019, SDCC's Resident Engineer met with members of Crumlin Clean Up Group. Additional meetings are planned prior to submission of the planning application with the Recorders Resident Association from the Whitehall/St. Anne's area, and the Glendown Residents Association. In addition, an Open Meeting organised by Cllr. Tara Deacy, DCC was held on 28th November 2019 at a local venue in Kimmage where SDCC's Resident Engineer and NOD's Project Manager gave a presentation on the development of the scheme and answered questions. A follow up information afternoon was organised by Cllr. Deacy in the Mount Argus Parish Centre from 2pm until 6pm on 18th December where SDCC's Resident Engineer and NOD's Project Manager were also present with project drawings to answer any questions from the public with over 25 people attending over the course of the afternoon.

Throughout the project design and preparation of the EIAR, every effort has been made to engage with and respond to queries from local communities, either representatives of resident's groups or individuals who have made contact through the project website. In early December on foot of a request on the project website and email to Dublin City Council, the proposed plans for St. Martin's Drive, Kimmage were shared by DCC with the head of the St. Martin's Residents Association.

3.5 Engagement with Elected Members

The project's Resident Engineer from SDCC worked closely with the project team and Steering Group and was tasked with providing information and updates on the Scheme to local representatives during the course of project design and production of the EIAR. Project updates were provided at meetings of the SDCC/DCC Area Committees on various dates (see below), and at the full Council meeting of SDCC in May 2019.

3.5.1.1 Reports to Councils

The Resident Engineer provided progress reports at the following meetings of local area committees in the two Councils.

SDCC

- 09/10/2018 – Rathfarnham Templeogue Terenure Area Committee Meeting
- 22/10/2019 – Tallaght Area Committee Meeting
- 05/02/2019 – Environment Water and Climate Change Strategic Policy Committee
- 06/11/2019 - Update provided to SDCC Environment Strategic Policy Committee

DCC

- 08/10/2018 – South East Area Committee Meeting
- 17/10/2018 – Central Area Committee Meeting
- 09/09/2019 - South East Area Committee Meeting
- 09/12/2019 – South East Area Committee Meeting

3.6 Engagement with Council Officials

The project team worked collaboratively with the Steering Group throughout the course of the project design and preparation of the EIAR. SDCC's Resident Engineer and individual Steering Group members facilitated discussions with officers from planning, engineering, roads, public realm and heritage sections in the two Councils.

3.7 Future Public Consultations

As indicated on the site location plan drawings, site notices will be erected at key points along the proposed Scheme. Plans and documents in relation to the planning application will be published on the project website www.poddlefas.ie. Plans and documents will also

be on public display in each of the Council offices and at main libraries once the application is lodged. The Councils will provide regular progress updates on the project website.

The Councils will also distribute an information sheet to the local communities in the vicinity of the Scheme, and will hold information events at venues in both Council areas once the application is lodged with An Bord Pleanála.

It is the intention of the Councils to keep property owners, residents, park users and the wider communities informed of the progress of the Scheme through key stages via regular updates on the project website.

3.8 Summary

The information received in the EIA scoping consultations and engagement described above was passed to key members of the project team for consideration in the project design. This engagement has resulted in a scheme that provides benefits to the community beyond the essential flood alleviation and protection with enhanced biodiversity, improvements to the public realm, and a scheme that is constructible and workable for Council staff who will be required to maintain it during the operational phase.

4 THE NEED FOR THE PROJECT AND ALTERNATIVES CONSIDERED

4.1 Introduction

The flooding issues in the River Poddle catchment are well documented. The River has overflowed its banks at several locations posing a risk to property and human life. Residents in the catchment have also reported the under capacity of the drainage network causing flooding on a number of occasions. The need for the Scheme was highlighted by the severe flooding along the Poddle watercourse on the evening of 24th October 2011. The proposed project is a sustainable Flood Alleviation Scheme along the River Poddle which is designed to reduce or prevent damages and risks associated with the river flooding in the study area.

4.2 Historic Flood Events

Past flood events in the Poddle catchment are documented in the Eastern Catchment Flood Risk Assessment and Management (CFRAM) Inceptions Report for Hydrometric Area (HA) 09 (April 2012). The most notable events over the past thirty years are described below.

- **24-25/10/2011** - The need for the Scheme was reinforced by the severe flooding along the Poddle watercourse on the evening of 24th October 2011 when up to 90mm of rain fell within a 6-hour period. This rainfall resulted in major flooding along the Poddle watercourse. It was reported that in a number of rain gauging locations throughout Dublin, the rainfall exceeded the 2% Annual Exceedance Probability (AEP) (1 in 50 year) total and in some locations a 1% AEP (1 in 100 year) was exceeded.

  During this event, the River Poddle flooded the entrance and basement of Our Lady's Hospice at Harold's Cross (see photographs provided in **Figure 4-1**).

  Numerous premises in Harold's Cross were severely damaged by the flooding especially Greenmount Avenue and Boyne Court Apartments. A woman drowned when she became trapped in her basement flat on Parnell Road, Harold's Cross. Crumlin was also badly hit as the River burst its banks at Ravensdale Park.

  Post flood surveys were carried out to record flood extents and levels wherever possible. The resulting level information, photographs and anecdotal evidence were used to calibrate the most recent version of the hydraulic model.

- **05/09/2008** - There was 47.88mm of rainfall recorded at Casement and 57.9mm was recorded in the Kimmage area over an 11-hour period which is approximately a 20% AEP (1 in 5 year).

- **06/11/2000** - The Poddle overflowed its banks in the Kimmage area when 103mm of rain fell over a 48-hour period in the Dublin area with estimated return periods of 4% to 3% AEP (1 in 25 - 33 year).

- **11/06/1993** - The Poddle River was reported to have overtopped its banks. Rainfall was reported to be in the order of a 1% to 0.4% AEP (1 in 100 - 250 year) event. This was a long duration event in excess of 24 hours and the flooding was relatively minor.

- **25/08/1986** - Hurricane Charlie caused significant flooding throughout Dublin. Along the River Poddle, a total of 80 households and 5 commercial properties were seriously affected by the flooding. The affected area stretched from Kimmage Cross Roads to the Grand Canal. Roads affected included Rathland Road, Sundrive Road, Lower Kimmage Road and Greenmount Lane West.

Figure 4-1: Photographs of the flooding at Harold's Cross October 2011

4.3 Consideration of Alternatives

4.3.1 Introduction

Article 5 of the amended EU EIA Directive 2011/92/EU requires that the EIAR shall contain *"a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment."* Per Annex IV of the amended Directive, information in the environmental impact assessment report should include a description of the reasonable alternatives relevant for the project in terms of design, technology, location, size and scale; and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

This section details this assessment of alternatives and discusses the evolution of the preferred option now subject of this EIAR.

4.3.2 "*Do Nothing*" Scenario

If the Flood Alleviation Scheme is not implemented on the River Poddle the possibility of future flood events, like those that occurred in 2011, will continue. Climate change is already on course resulting in more intense storms and rainfall events and an increased likelihood and magnitude of river and coastal flooding in the future. This will have economic and social impacts on businesses, residents, public infrastructure and services that have been affected by previous flood events. It is therefore considered that the "*Do-Nothing*" scenario is not an option.

4.3.3 Alternative Locations

The purpose of the proposed project is flood alleviation for the River Poddle. The proposed works are aimed at protecting land and property located along the river from flooding in the future. Consideration of alternative locations is, therefore, not relevant to the project.

4.3.4 Examination of Alternatives – CFRAM

As discussed previously in **Section 2.4.4** of this EIAR, the examination of alternatives for the River Poddle Flood Alleviation Scheme is documented in the River Poddle Options Report (2014)[15]. The Poddle Options Study presents an examination of existing and potential future flood risk within the study area. The assessment modelled the floodplain and tested how different areas reacted to flood event scenarios to identify the receptors and properties most at risk.

4.3.4.1 Flood Risk Management Measures

The various ways of managing flood risk and can be grouped as follows:

- Protect methods - reduce the likelihood of flooding. Methods include flood walls, flow diversion and upstream storage.

[15] Eastern CFRAM Study Poddle Options Report, RPS Group, July 2014, https://bit.ly/2GF1P29, [accessed 23/04/19].

- Prepare methods - reduce the impact of flooding. Methods include individual property protection, flood forecasting and public awareness campaigns.

- Prevent methods - avoids future flood risk. Methods include planning and development control.

- Permit methods - accepts that flooding will occur. Methods include maintaining the existing regime and doing a minimal amount of maintenance.

The aim of the Study was to identify the most cost-effective options for managing flood risk along the River Poddle to provide the highest degree of protection to the greatest number of properties possible.

4.3.4.2 Standard of Protection

For the Poddle River, the standard of protection applied in the flood risk assessment is the 1% Annual Exceedance Probability (AEP). This is where there is a 1% or 1 in 100 chance of occurring in any year.

4.3.4.3 Residual Risk

For any given flood risk management option, the risk of flooding cannot be completely eliminated as there is always a risk of a flood event greater than the design standard occurring (*i.e*. a 1 in 200 or a 1 in 1,000 chance). This is known as residual risk.

4.3.4.4 Screening of Flood Risk Management Measures

The CFRAM Poddle Options Report considered a long list of the structural and non-structural methods available for flood risk management generally. These included land use management within the floodplain, increased maintenance, upstream storage, hard defences, and emergency planning (*i.e*. protect, prepare and prevent methods). These methods were then screened for their applicability to the Poddle River and against technical, economic, social and environmental criteria.

The Options Report then considered the viable structural and non-structural options and measures for the effective and sustainable management of flood risk within the Poddle catchment.

4.3.4.5 Consideration of Flood Risk Management Options

Once the measures were screened, they were combined to create potential options. These options were subject to further screening with weighted scores under technical, economic, social and environmental criteria (referred to as multi-criteria analysis or MCA). The preferred flood risk management options were then identified by overall scoring based on:

- Benefit Cost Ratio (BCR) - The ratio between the monetary benefit of adopting a FRM option and the overall cost of constructing, operating and maintaining the option. A ratio of one or greater must be achieved for an option to be considered further;

- MCA score - The sum weighted score of all of the objectives set in the MCA. This score represents the non-monetary benefit of adopting the FRM option; and

- Overall Net Benefit/Cost - This is a ratio between the non-monetary benefit of adopting an FRM option and the overall cost of constructing, operating and maintaining the option.

4.3.4.6 The Preferred Options

The analysis briefly described above and detailed in the 2013 Poddle Options Report resulted in the selection of three options to bring forward for public consultation as follows:

- Option 1: Hard defences and sealing manholes;
- Option 2: Option 1 with upstream storage at Tymon Park; and
- Option 3: Option 1 with diversion of flow to the River Dodder.

Option 1 was ruled out after consultation with the communities affected. Option 2 was selected as the preferred option since it had a better overall net benefit/cost ratio, providing greater benefits across all criteria of people, the environment, cultural heritage and the economy. Option 3 was reserved for further consideration due to its comparative economic merits.

A further study of the impact of diverting flows to the River Dodder (Option 3) was carried out and is presented in the 2013 Options Report. This study determined that 700 properties were then at risk from a 1% AEP flood event from the River Dodder. Diverting flows from the River Poddle would result in an additional 109 properties being put at risk along with 409 properties from the current 700 being placed at increased risk due to increased food depth.

It was determined that both Options 2 and 3 (hard defences with storage or diversion respectively) were viable and had positive economic benefit-cost ratios. While the economic benefit-cost ratio for Option 3 was slightly higher, Option 2 scored a better overall net benefit / cost ratio (*i.e*. it provides greater benefits across all criteria of people, the environment, cultural heritage and the economy per euro spent). Option 2 was also the preferred option of the local community, where after public consultation, it was found there was concern about the increase in flood risk along the River Dodder from a diversion of flood flow from the Poddle since the Dodder was a river already subject to significant flood risk.

4.4 Examination of Alternatives - Updated hydraulic modelling

Prior to the detailed design of the project, an updated hydraulic assessment of available alternatives was undertaken by NOD and Black & Veatch on behalf of SDCC and DCC.[16] The Hydraulics report presents the findings from modelling updating the CFRAM hydraulic model based on new data from flow and level surveys for the river, and incorporating new developments and modifications that have taken place since the model was originally built. The model was then run for a series of storm, blockage and climate change scenarios and was used to test a number of flood alleviation options. Three flood alleviation options were

[16] River Poddle Flood Alleviation Scheme. Hydraulics Report. Prepared for South Dublin County Council and Dublin City Council by Nicholas O'Dwyer and Black and Veatch, 12th February 2019.

considered in the design proposals and tested in the model. These are described in the sections following.

In the examination of options, consideration was given to Natural Floodplain Management (NFPM). Given the highly urbanised nature of the catchment there are limited opportunities for NFPM. Other areas where natural storage could be accommodated are small when compared to Tymon Park. Channel re-alignment further downstream at Whitehall Park and flood storage at Ravensdale Park would help to manage flood levels in these residential areas.

4.4.1 Scheme Design Option 1

The first option modelled was to raise flood defences along the whole length of the river to prevent flooding, in some cases to 2m or higher. This option would require 44 linear defences of different lengths and heights along a 3.8km length of the watercourse. With this option manholes would need to be sealed mainly downstream of Poddle Park and downstream of the Grand Canal after which the River Poddle is culverted to the River Liffey.

With this option there would be residual flooding due to the lack of capacity of the surface water network and also because a number of proposed walls would prevent floodwaters from entering the watercourse. The water level in the River would increase due to the new flood defences constraining the flow, resulting in increased flooding upstream. To solve these issues a number of pumping stations would be required to pump runoff across the proposed defence lines.

4.4.2 Scheme Design Option 2

The second option is similar to Option 1 but also uses storage at Tymon Park to reduce the downstream flood level. With this option, the pass forward flow from Tymon Park is limited to the 50% AEP flow and the number of linear defences is reduced to 27 over a length of 1.5km. The linear defences would be lower in this option, and it would include a raised Flood Storage Embankment at Tymon Park and 3-walled flood storage area in Ravensdale Park. Along the stretch of the River Poddle that is culverted from the Grand Canal to its discharge to the River Liffey, a number of manholes would have to be sealed.

4.4.3 Scheme Design Option 3

A third option was considered which is similar to the second option above but transfers some of the flow out of Tymon Park to the River Dodder to reduce the height of the defence required at this location. This option was ruled out due to the fact that there are currently flooding issues on the River Dodder with a Flood Alleviation Scheme ongoing and adding additional flows from an adjacent catchment would make things worse.

4.5 The Preferred Option

The preferred option, and the one considered for this EIAR, is **Scheme Design Option 2**. This was envisaged as the construction of a flood storage reservoir at Tymon Park (east of the M50) to prevent flooding downstream combined with localised flood defences including embankments and walls to prevent flooding in the immediate areas, and a smaller storage area in Ravensdale Park to store flood water when the culvert in Poddle Park surcharges. Manholes in the vicinity of Poddle Park and St. Teresa's Gardens and

Donore Avenue are proposed to be sealed as part of this option to prevent flooding as the system is surcharged.

4.5.1 Contributing surveys and studies

Surveys and studies were carried out for the project and contributed to the engineering and design of the Flood Alleviation Scheme. These included a structural and condition survey of over 50 structures (*i.e*. culverts, weirs and bridges) along the River from Greenhills Road, Tallaght to Gandon Close, Harold's Cross. The findings from the survey have informed a robust maintenance programme that is underway to repair the structures including reinforcement, repointing, replacing stones, and clearing vegetation.

The hydraulic modelling was verified with information from post-flood surveys after the 2011 event, and with data from a topographic survey along the channel and closed-circuit television (CCTV) survey of Lakelands culvert and Priory Road, and a flow survey conducted over 6 weeks along the route of the channel. Based on this information, maximum flood levels were checked along the whole length of the River to identify areas where flood defences were required and to determine the heights of defences.

An engineering survey was then carried out to check the structure and condition of existing walls to determine the works required (*i.e*. to construct new walls or reinforce or replace existing walls) to a standard that will provide flood protection.

4.6 Design of the Preferred Option

Scheme Design Option 2 makes best use of the flood storage capacity at Tymon Park and reduces the size and lengths of defences required downstream. The flood storage area further downstream at Ravensdale reduces the required height of defences in this area. The Scheme as planned is designed for a 1% AEP with 60% blockage in 12 major culverts and 40% in the remaining culverts.

The walls and embankments in the proposed River Poddle Flood Alleviation Scheme have been designed to cope with fluvial flooding (*i.e*. holding back water from going over the banks). Pluvial flooding, which arises when the amount of rainfall exceeds the capacity of urban stormwater systems or the ground to absorb it, is managed by the local authorities through the guidelines and codes of practice adopted in the Greater Dublin Strategic Drainage Strategy which promotes Sustainable Urban Drainage Systems.

The surveys and modelling carried out for the proposed Flood Alleviation Scheme has also identified areas that are subject to periodic flooding due to inadequately sized surface water network and connections with undersized combined sewers. These areas are Whitehall / Perrystown, Mount Argus, Cork Street and The Coombe. In these locations the surface water system does not have adequate capacity to drain the local area and flooding occurs before it has a chance to reach the River. The drainage departments in SDCC and DCC are reviewing these areas and planning remedial works which will be carried out separately from this Scheme.

4.7 Examination of Alternatives

4.7.1 Flood storage at Tymon Park

The flood storage proposals for Tymon Park, as envisaged early on in the CFRAM, will help the river system cope with both fluvial and pluvial flooding downstream in a 1% AEP event. A flow control structure or weir will release flows up to a 2-year Return Period event with the excess being stored.

Two design options were considered for flood storage at Tymon Park. Option 1 comprised designing the entire downstream face of the storage embankment as the spillway for exceedance. Option 2 included a concrete channel spillway (illustrated in **Figure 4-2**).

The effect of utilising the entire embankment as the spillway for exceedance events (Option 1) is that a lower embankment height could be used. There is also less potential for pollutants entering the watercourse during construction than for the second option which requires a significant concrete structure.

Option 1 was chosen for the above reasons, as well as for the fact that it would be less intrusive visually, required less tree removal, and could be more readily incorporated into the landscape of the park. A specialist reservoir analysis was carried out by Black & Veatch to ensure the embankment would be structurally sound as an impoundment. The proposals will require permanent changes to the footpaths in the vicinity of Tymon Lake, and replacement of the footbridge. Specialist landscape mitigation plans have been commissioned and the final proposed concept plan is provided in **EIAR Volume 3**.

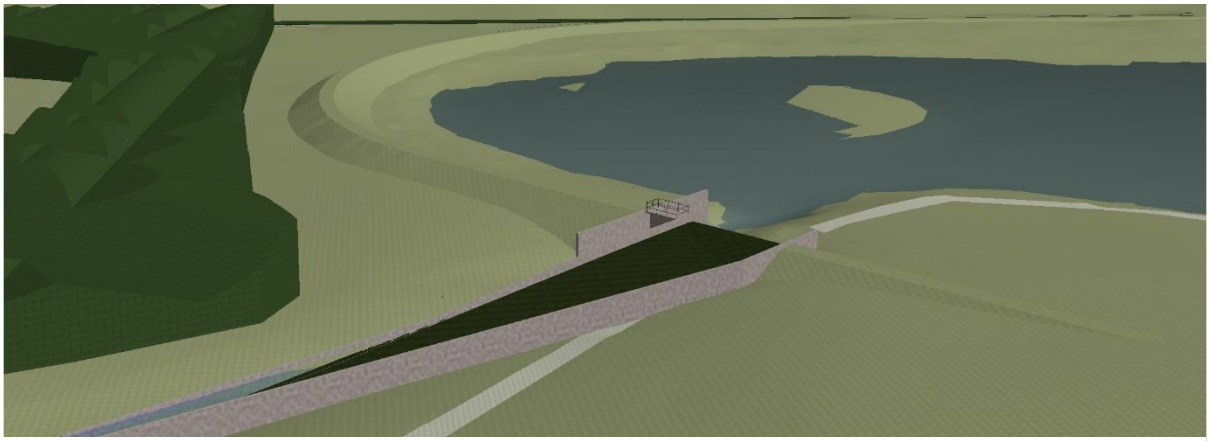

Figure 4-2: Option 2 Tymon flood storage embankment

4.7.2 Channel re-alignment at Whitehall Park

The proposed channel re-alignment and regrading works at Whitehall Park makes the best use of a remnant open space in a residential area. This open space, which is maintained by the Council, is grassed with trees and hedges along the river edge and is accessible by foot *via* Templeville Road.

The options considered were Option 1, to build new walls along the boundary of residential properties where the river channel was closest, at Whitehall Park and Whitehall Close, or Option 2, to realign the channel along a length of approximately 120m x 22.5m to the south, away from the properties.

In Option 1, the construction of walls would be along the property boundaries and achieving the required height for flood protection and stability would require excavation to a suitable depth. This would have meant encroaching on gardens, outdoor amenity space and parking and circulation areas in private property. The required replacement walls from the river side would have been between 2 to 3m in height requiring significant foundation works. This was considered to have an unacceptable impact on neighbouring properties.

The preferred option, Option 2, was to realign the river channel, moving it away from potentially affected properties. The project team looked at options for creating a landscape feature with a terracing effect and adding public realm and access improvements (see **Figure 4-3**).

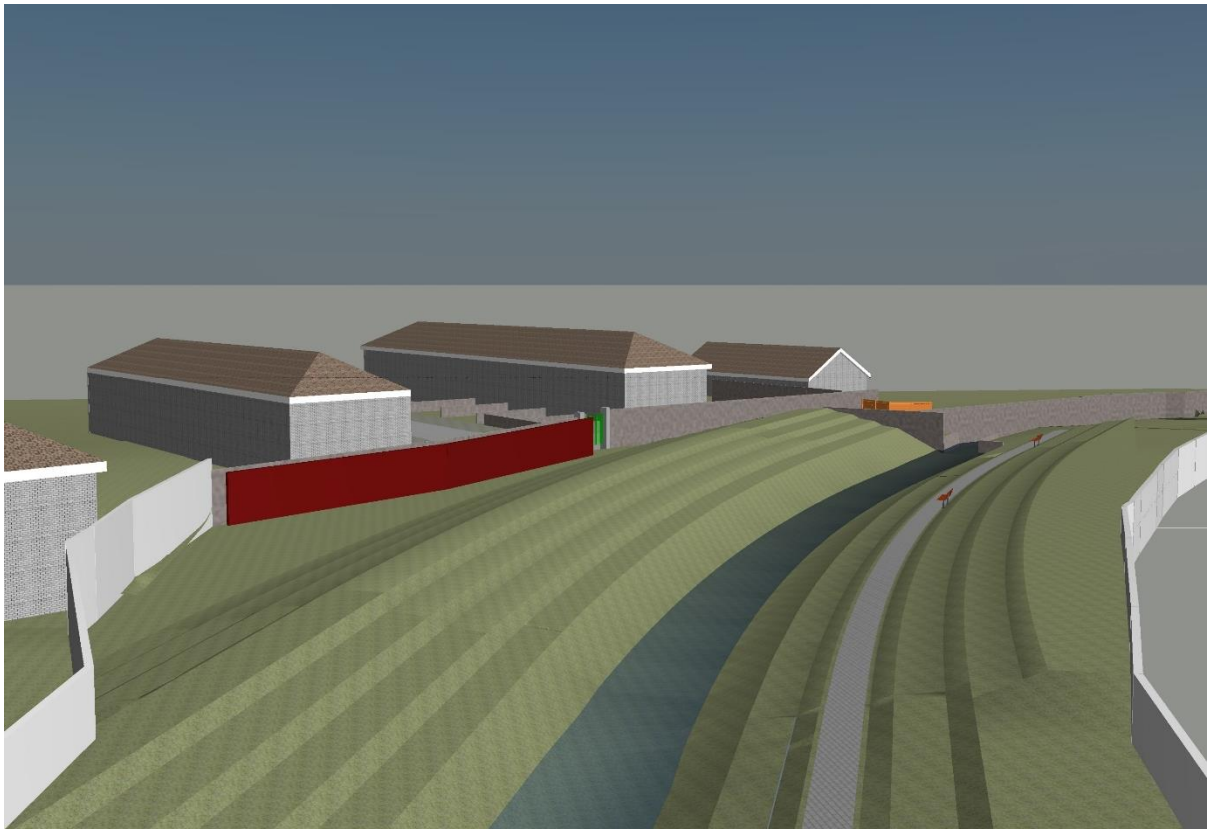

Figure 4-3: Option 2 Whitehall Park with terracing

However, after consideration of factors such as constructability, maintenance, public access, biodiversity, and the aquatic environment, the final proposal was amended to re-align the channel with a slight meandering rather than curved, and, as there is currently no throughway access in this green space, and no plans for such, it was recommended to dedicate this space for biodiversity enhancements to include planting a native wildflower meadow. Reducing the terracing to more gentle slopes upon completion of the realignment of the channel will provide for ease of maintenance of this space.

The realignment of the channel will have a short-term negative effect on the river channel morphology in comparison to the option of leaving the channel in its current location. However, once established, the new alignment of the channel will not have a negative

effect on river morphology and with the meander, may be beneficial in terms of biodiversity and aquatic life.

The detrimental impact of the intrusiveness of the flood walls on adjacent properties was considered unacceptable when compared with the benefits for flood protection to be achieved by moving the river away from properties, along with the added benefits of an enhanced area for biodiversity. These benefits outweighed the minimal short-term impact of the channel realignment and thus this option was progressed to the final design.

4.7.3 Flood storage at Ravensdale Park

Two options were assessed in order to provide the required flood storage in Ravensdale Park. The original first option, Option 1, was similar to that proposed during CFRAM which involved creating a flood barrier along the west, north and eastern faces of the Park to contain the flood waters while the downstream culvert surcharged. The issue with this proposal was that it blocked the open access to the Park from the northern point.

The solution was to construct an earth embankment through the northern end of the Park and raise the existing boundary walls either side to contain the flooding. Regrading of the pathways at gentle slopes would be required in this option to prevent egress of floodwater while maintaining access points to the Park. This option included channel re-alignment to improve hydraulic efficiency of the channel in the Park (see **Figure 4-4**), and would have resulted in the loss of 70-80% of the trees within the Park. Following discussion of the proposals with DCC Parks and Landscape Services, a tree survey was commissioned for this Park and other locations where flood walls are proposed, and photomontages were specially prepared to illustrate proposals at the Park and other sites to facilitate further discussion with officials.

As the extensive regrading works required for the pathways and access points in Option 1 for Ravensdale Park would have required the removal of the majority of trees in the Park, this would have posed a significant detrimental impact both from an environmental and a social perspective due to the amenity value of the park to the local community.

The second option, Option 2, now proposed, comprises the construction of the wall along the channel side of the existing path and through the middle of the Park to contain the floodwater within this area. This option was deemed preferable as it would confine floodwaters in a smaller area, it would require far less tree removal, and it has greater potential for public realm enhancements such as seating and planting. The height of the required walls is less than the embankments proposed in Option 1 and this option also includes replacing the existing footbridge leading to Ravensdale Drive from the Park with an arched deck and parapet walls. This is necessary as the existing bridge deck acts as an obstruction to high flows as well as allowing flood water to migrate from the Park out into Ravensdale Drive. In addition, the wall behind the builder's providers has to be reinforced for flood defence. Options for public realm improvements were prepared for this Park to aid consultation with DCC officials. Specialist landscape mitigation plans for the Park have been commissioned and the final agreed concept plan is provided in **EIAR Volume 3**.

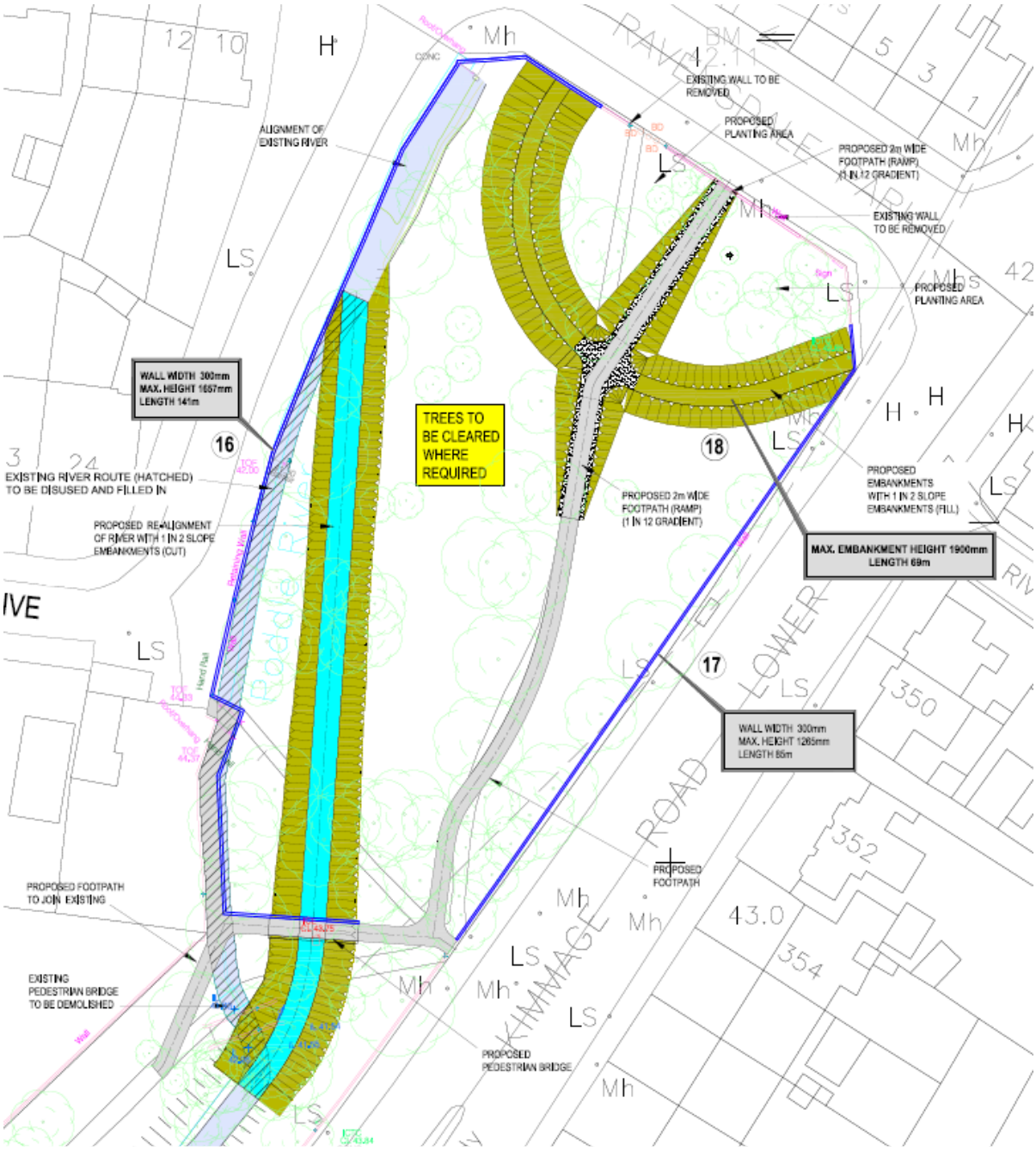

Figure 4-4: Option 1 flood protection proposals for Ravensdale Park

4.7.4 Flood protection walls at St. Martin's Drive

Two different options were considered for flood protection walls at St. Martin's. The first option was to provide the flood defence wall along the existing footpath as far as the cul-de-sac, instead of along the riverbank for the entire length as required to provide flood protection. This option would have required the wall to run 1.1m high along the riverbank at the southern cul de sac before turning away from the river and following the edge of the green space along the footpath. The section of flood wall stepped back from the river would be approximately 0.5m in height, as opposed to a height of 1.1m in the second option of constructing the wall along the entire length of the riverbank. This option would

have resulted in the loss of fewer trees, especially from the bank side, however, local residents expressed a concern about anti-social behaviour at this location and did not wish to see any improvements to the green area to change its use from a passive space to an active space. It was considered that a wall 0.5m in height would constitute such a change, cutting off the green space from the houses adjacent, and in spite of the loss of bank side trees and vegetation, the preferred option, and the one that is proposed, is to construct the flood protection wall close to the bank. A replanting and landscaping plan is provided in **EIAR Volume 3**.

5 THE PROPOSED DEVELOPMENT

5.1 Introduction

This chapter has been prepared by NOD. It provides a description of the proposed works, including temporary works, and an overview of mitigation measures to be implemented to ensure that potential environmental impacts are minimised during construction. It also describes how the Scheme will operate during a design storm event; how the Scheme design accounts for climate change; the risk of major accidents and/or disasters and how these are accounted for in the design; plans for maintenance of the Scheme; and the benefits of the Scheme.

The description of the proposed works is based on an outline design with sufficient information to allow a robust impact assessment. Certain aspects of the Scheme may be subject to minor refinements in the detailed design phase. To ensure that these are included in the impact assessment, the EIAR has presented a 'maximum project' scenario and considered the likely significant effects and mitigation measures accordingly. Those areas where the detailed design may result in minor alterations to the planned works (*e.g.* footprint of embankments) are addressed in the mitigation section.

In its operational phase, the Scheme will require ongoing maintenance such as clearing culvert screens and keeping sections of the channel clear of vegetation growth. The decommissioning of the project itself is not considered since the proposed Scheme will not be taken out of service at any point in the future.

5.2 Proposed Scheme

The proposed Scheme is designed to alleviate flooding in the River Poddle in a 1% Annual Exceedance Probability (AEP) flood event (also known as the "100-year flood") with 60% blockage in the major culverts and 40% blockage in all other culverts, with an allowance for freeboard in accordance with the OPW guidance. The Scheme combines flood defences along the River channel with main flood storage in Tymon Park and additional flood storage at Whitehall Park and Ravensdale Park. The proposed works are described generally as follows:

- **Raised earthen flood embankments** along the upper reach of the River in Tymon North (west of the M50) and Tymon Park (east of the M50) to provide flood protection. The embankment at Tymon Lake in Tymon Park will be constructed to provide the main flood storage in the Scheme and a **flow control structure** at Tymon Lake will control flows downstream in a flood event.

- An **integrated constructed wetland** in Tymon Park to improve water quality.

- New, replacement or reinforced **flood walls** to provide flood protection in residential areas in the middle reach of the River at Whitehall, Kimmage and Perrystown; at Wainsfort Manor Crescent, Terenure; to the rear of properties on Fortfield Road south of Kimmage Crossroads, Kimmage; at the end of St. Martin's Drive in Kimmage; and at Mount Argus Close in Harold's Cross.

- **Channel realignment and regrading** in Whitehall Park to provide clearance between the River and adjacent properties for flood protection.

- **Providing sealed manholes** in the vicinity of Poddle Park and Ravensdale Park, Kimmage, and in St. Teresa's Gardens and Donore Avenue, and at the National Stadium in Merchant's Quay, Dublin.

- **Ancillary works and associated development** including drainage channel clearance and removal of trees where required for the works; rehabilitating or installing culvert screens in locations as required; installing flap valves in all culverts draining to the River; biodiversity enhancements including installation of floating nesting platforms in Tymon Lake, Tymon Park, Tallaght; and landscape mitigation and restoration at Tymon Park, Tallaght, Whitehall Park, Terenure, and Ravensdale Park and St. Martin's Drive, Kimmage including public realm improvements, replacement footbridges, biodiversity enhancements, tree planting and landscaping.

- **Temporary works** include a main construction compound in Tymon Park with access off Limekiln Road, which will be in operation for the entire duration of the works. Additional temporary works/ set down areas at Wainsfort Manor Crescent, St. Martin's Drive and Ravensdale Park, which will be in use for the duration of the works to be carried out in these locations. Other temporary works include temporary stockpiling of excavated earth in Tymon Park; temporary channel crossings at Tymon Park (west and east of the M50) in Tallaght, and channel diversions at Tymon Park, Tallaght and Whitehall Park, Templeogue to enable the works along the River channel to be carried out.

The proposed Scheme is illustrated on the planning drawings submitted with the planning application (**Drawing nos. 08131 to 08253).**

5.3 Construction of the Proposed Scheme

A brief description of how the main elements of the works will be constructed is provided below. Further detail can be found in the **Outline CEMP** contained in **EIAR Volume 4, Appendix 5.1** and Drawings

5.3.1 Site Access

For the most part, works areas will be accessed from public property or public roads. Access to private property may be required in locations where walls have to be replaced. The preference is to undertake these works from the bank opposite where there is sufficient space and where workers can operate machinery safely.

5.3.2 Temporary Works Compounds

The primary construction compound will be located within Tymon Park with an entrance off Limekiln Road **(Drawing No. 08140** of the planning drawings**)** which will be in place for the entire duration of the works (24 months). The entrance to the works compound off Limekiln Road will be created by removing a section of the block wall and fence. Some trees will be required to be removed for the compound. The main works compound will have a surface created by stripping topsoil and subsoil, laying down geotextile material and then laying a working surface of crushed stone. The excavated soils will be stored at the site for subsequent use in reinstatement. The compound will have site offices, welfare facilities and car parking. It will be fenced with a 2.4m high chainlink fence and hoarding.

Only materials and plant necessary for the works will be stored there. Oils, lubricants, solvents, fuel, *etc* may be stored in bunded areas on site.

Works / set down areas will be established at Wainsfort Manor Crescent, Ravensdale Park and St. Martin's Drive as above. These will be fenced, temporary compounds without offices to securely store machinery and some materials.

5.3.3 Temporary Access Tracks

Temporary access tracks through Tymon North and Tymon Park have been carefully designed to avoid sensitive habitats and ecological features. In some cases, these routes make use of existing pedestrian and vehicular accesses which will be widened and constructed as necessary making a firm base as with the works compounds.

Before construction commences any works areas that overlap with public roads and pedestrian footpaths will be isolated with security fencing and construction hoarding. Every effort will be made to ensure the public can continue to enjoy public areas, considering health and safety of the workers and public.

5.3.4 Temporary River Crossings

The works to create the embankments in Tymon North and Tymon Park will require river crossings at strategic locations of a width of 4m to 6m. The riverbank will be partially graded back to an angle of approximately 45 degrees over a 6m length of both banks. A layer of geotextile membrane will be placed along the regraded bank profile, and a 6 to 8m length of precast concrete pipe (750 to 900mm diameter) will then be placed in the channel and backfilled using crushed virgin rock up to a level of just below top of bank. When works are complete the backfill and pipe will be removed from river and the banks will be reconstructed by compacting.

5.3.5 Material Stockpiling

The top layer of soil (approximately 200mm depth) contains valuable ecological material that will be saved separately from subsoils and will be used to reinstate excavated areas and allow for natural restoration and establishment of plants. Stockpiles of this material are to be stored in banks no more than 1m high.

All materials excavated from the works areas will be stockpiled as close to the area where they are to be re used in landscape restoration in order to minimise on-site haulage and double handling. Areas for material storage in Tymon Park have been chosen with consideration of sensitive habitats and ecological features and use of the green spaces in the Scheme. These are shown on **Drawing No. 08148** of the planning drawings.

Stockpiles of other material will be formed no more than 2m in height and will be sealed using the back of an excavator bucket or tracked upon by a tracked excavator to ensure the stockpile does not become saturated and therefore difficult to handle when being reinstated into the works. All stockpiles will be clearly defined, fenced and signed to ensure no cross contamination of other materials to be stockpiled. It is estimated that approximately 3,000m^3 will be temporarily stockpiled at Tymon Park for re-use.

An estimated 5,000m^3 of material is to be excavated and reused elsewhere on site or locally. The excess material from the excavation works will be used as bulk fill,

embankments or landscaping where possible. It is estimated that 50% of the material will be required for the embankments and landscaping and the remainder will be taken off site for disposal at an agreed licensed area. All material removed from site will be disposed of in accordance with relevant waste management legislation. Where material cannot be reused on site, it will be exported to co-ordinate deliveries of imported fill with a load of unsuitable material requiring removal from site in order to minimise traffic movements.

5.3.6 Tree Removal

Individual trees and tree groups which are impacted by the proposed development have been identified through a specially commissioned tree survey. The findings of the tree survey are illustrated in the tree classification, tree constraints and tree removal and protection areas drawings, along with records of the number and species of trees affected by the Scheme in the surveyed areas. The findings of the tree survey are reported in the **Tree Survey and Arboricultural Impact Assessment Report** contained in **EIAR Volume 4, Appendix 5.2**. The drawings to accompany the tree survey are contained in **EIAR Volume 3**.

Trees will be removed in advance of the works in accordance with the approved Construction and Environmental Management Plan. Any trees that have to be removed during nesting periods will be done under the supervision of the Ecological Clerk of Works.

The proposed development of the Flood Alleviation Scheme will require the removal of a number of trees to facilitate both the Scheme itself and the construction process. The majority of trees lost are of moderate value. New semi mature tree planting is proposed as an integral part of the Scheme, which will assist in mitigating the proposed tree removals.

The report concludes with recommendations for protection measures to ensure the conservation of those tress to be retained during the construction process.

5.3.7 Earthen Embankments

The proposed works to construct the embankments will require removal of trees in Tymon North and Tymon Park for access by machinery and personnel.

Topsoil will be stripped from the footprint of the embankment before the construction starts. This will help to key the embankment to its foundation and to reduce settlement. The material will be stored for reuse in landscape restoration in accordance with the landscape mitigation plan in **EIAR Volume 3**.

Approximately 3,000m^3 of preferably clayey material will be required to be brought on to site to construct the embankment at Tymon Lake. Wherever possible uncontaminated, locally sourced material will be used. The required strength will be achieved by constructing the embankment in layers and compacting each layer using the appropriate mechanical plant.

If the construction material is highly permeable prevention measures must be in place to avoid seepage through the foundation. Sheet piles can be driven deep enough into the core of the embankment to provide an effective cut off.

After construction of the embankments the works areas will be reinstated. Any remaining material after the construction is complete will be removed from the site and disposed of in accordance with relevant waste management legislation.

Activities such as final landscaping and grass seeding will take place after the construction is complete in accordance with an agreed landscaping plan.

5.3.8 Flow Control Structure

Construction of the flow control structure at the embankment at Tymon Lake will follow after the piles are installed. Sheet piles will be used to hold the stream flow. An excavator will be used to dig a trench and install a pre-cast 900mm concrete pipe which will be backfilled to provide a temporary bypass of the River while the flow control structure is being constructed. The sheet pile will then be removed to allow the flow to pass through the temporary culvert. A sheet pile cofferdam will be constructed around the footprint of the flow control structure. This will be below the level of the embankment to permit the Poddle River to flow during possible extreme events. Whilst the flow control structure is being formed, a pump will remove water with silt controls including a silt bag and a settlement tank. The structure will be formed of concrete and poured in sections. Pumping operations will be discontinued when concrete is being placed adjacent to groundwater. After the structure is completed, the sheet piles and the temporary bypass pipe will be removed by an excavator. The embankments will be constructed around the flow control structure in the method described above.

5.3.9 Integrated Constructed Wetland

The main earthworks activities involved in the development of the Integrated Constructed Wetland (ICW) in Tymon Park are levelling, excavation, and placement of soils for integration with existing topography. An estimated 5,000m^3 of material is to be excavated and reused elsewhere on site or locally. The excess material from the excavation works will be used as bulk fill, embankments or landscaping where possible. It is estimated that 50% of the material will be required for the embankments and landscaping and the remainder will be taken off site for disposal at an agreed licensed area. All material removed from site will be disposed of in accordance with relevant waste management legislation. The main construction works are briefly summarised below, and more detail can be found in **EIAR Volume 4, Appendix 5.3** with accompanying maps displayed in **EIAR Volume 3**.

A temporary river water management system will need to be established during the earthworks. To reduce the impact of construction works on the river flow the ICW will first be constructed outside of the river channel and erecting temporary bunds along the existing river route to contain and maintain river flows.

The stone baffles and stone weir and are to be installed at the inlet point and outlet points respectively from material acquired from site where suitable and available, otherwise locally sourced natural stone can be used.

On completion of construction and planting, the river will be diverted into the ICW and temporary bunds removed. The ICW can then be finished off with remaining levelling and planting where required. Careful timing with regards to weather conditions and silt mitigation methods will need consideration prior to construction stage scheduling. All in-

stream works should ideally be carried out in low flow periods (i.e. between July to September), unless otherwise agreed.

There should be no requirement to import or export material to or from the site for construction of the ICW, however this will need to be confirmed during site investigation. Indicative levels are provided in the ICW layout **Drawing No. 08146** of the planning drawings**.**

The base of the ICW cell will be completely level to promote dispersal across the entire treatment area. The slope gradient will vary depending on landscaping requirements but will be at 4:1 minimum. There may be slight variations to the layout and level of the ICW during construction, as required, so as to work within the confines of the site conditions and to utilise the characteristics of the site.

Appropriate access will be provided around the ICW site to allow for future monitoring and maintenance works. Access to the site will be via existing park paths.

5.3.10 Channel Re-Alignment

At Whitehall Park the channel will be re-aligned to take it away from the adjacent properties. This will be achieved with the temporary diversion of flows through the use of sheet piles in the same method as the flow control structure in Tymon Lake.

5.3.11 Flood Defence Walls

Flood defence walls are proposed for areas to prevent the River overflowing its banks in the middle reaches. This will involve reinforcing existing walls, constructing new walls in places where there currently are none, and replacing existing walls. The flood defence walls will be constructed by the methods briefly described below. Selection of this method will depend on the condition of the existing foundation and wall, ground conditions, the height of the wall, and proximity of structures to the wall.

The construction of walls, whether reinforced or new walls, will require vegetation clearance on both banks.

Prior to construction the route of the proposed flood protection walls will be surveyed and set out. Any works areas that overlap with public roads and pedestrian areas will be isolated.

The construction of the walls will require some movement of materials to and from the site. Most of the materials leaving the site will consist of spoil from the excavation works and some demolition rubble. The excess material from excavation works that is not used as bulk fill, embankments or in landscaping will be removed from the site and disposed of in accordance with relevant waste management legislation.

Once the walls are constructed the area will be backfilled and reinstated. The walls will be finished in stone cladding or pointed with concrete capping beam on top. Reinstatement of lands and finishes will be to a specification agreed with the construction management team, SDCC and OPW.

5.3.11.1 Reinforcing walls

In cases where an existing wall is not structurally sound to withstand a flood it may be necessary to construct a scour protection beam. The advantage of this method is that it will avoid working in the rear gardens of properties, and the walls can be accessed from the opposite bank using an excavator. Culverts approximately 600mm will be installed in the channel to allow works to be undertaken by personnel. Channel flows will be temporarily diverted using 600mm pipes and a pump sump will be installed to direct the flow through a baffled settlement tank and discharged through a silt bag. A trench will be excavated alongside the existing wall foundation. The wall will be shuttered, then a reinforcing cage will be placed in the trench. The cage will then be filled with concrete and following this the pump would be switched off. Depending on the mix and ambient conditions the shutter would be struck in 24 to 48hrs and the process repeated. Once at the end of a 20m run, the haul road stone, pumping system, *etc.* would be moved along and the same process repeated until the scour beam is complete.

In certain situations, it may be necessary to retain the existing boundary wall and construct a new wall adjacent to or up against it. A possible solution will be to underpin the existing foundation and construct a new wall up against the underpin and extend this up to the required design level. The underpinning process is similar to that described for the scour protection beam with the exception that each underpin will only be in the order of 1m at a time when measuring along channel chainage so as to minimise the amount of unsupported foundation. Therefore, this process is considerably slower than that of the scour beam works.

5.3.11.2 New or replacement walls

Walls will have a precast base and will be constructed in situ. The walls will have to be underpinned as above, and a stone platform will be constructed, and the flow diverted through silt controls as above. It may be beneficial to precast (at a precasting yard) the bases of these units in lengths of 2m keeping the weight down avoid the use of very large excavators/cranes. Precasting would also minimise the need for pumping during the construction of the bases. It would be necessary to dig out and bed the bases at the required level and place them in units of 10m at a time. The bases will then be shuttered and poured. These works will be undertaken from the opposite (right) side of the bank using an excavator for digging and lifting operations.

5.3.12 Footbridge Replacements

The replacement of the footbridge in Ravensdale Park will involve the demolition of the existing bridge, excavation of foundations for the proposed bridge, craning in a precast concrete bridge and reinstatement of the area impacted by the works. The existing footbridge at Tymon Lake will be replaced with a new structure along the embankment using a similar method.

It is expected that any utility diversions required for the replacement of the bridge at Ravensdale will be completed prior to the demolition of the existing bridge.

5.3.13 Manhole Works

The work on manholes will be either to rehabilitate or replace manholes to seal them. The manhole at the rear car park of the National Stadium is required to be rehabilitated to

improve access for maintenance. The manhole rehabilitation works will consist if reinforcing the manhole chamber with concrete and anchoring the chamber to the concrete with an "L" bar, then replacing the cover and frame with a sealed unit or by replacing the covers with a sealed frame/cover solution.

With the exception of the manhole at the rear car park at the National Stadium, the manholes works will take place within the public roads. Works areas will be fenced off and a traffic management system will be put in place whilst manhole works are ongoing.

5.4 Landscape Mitigation, Tree Planting and Biodiversity Enhancements

Specific landscape mitigation plans have been prepared for the works areas at Tymon North and Tymon Park, and for Ravensdale Park and a tree planting and landscaping plan has been prepared for St. Martin's Drive. (see **EIAR Volume 3)**. The landscape mitigation plans were developed by the project's Landscape Architects and Designers with input from the project Ecologist and Arboriculturist and in consultation with SDCC and DCC Parks and Landscape departments.

The consultant team have recommended areas for replacement tree planting and these are displayed in the accompanying planning drawings and in the landscape mitigation plans contained in **EIAR Volume 3**. Replacement tree planting will be done in accordance with the landscape mitigation plans and in other areas as shown on the planning drawings in line with each Council's tree strategies and policies, and as agreed with each Council at detailed design stage.

It is noted that replacement planting may not occur in the affected locations due to space constraints but will be planted as closely as possible in nearby green spaces to benefit the local communities. The locations for additional replacement tree and woodland planting as a result of the proposed works in Tymon Park and Wainsfort Manor Crescent will be agreed with SDCC at detailed design stage.

5.4.1 Tymon Park (west and east of the M50)

The objectives of the landscape mitigation plan for Tymon Park Lakes were to provide pedestrian access, sitting out areas, replacement tree planting, and to create and restore habitats. Habitat loss and disruption to resident flora and the human community are an inevitable feature of the Flood Alleviation Scheme where the main flood storage and ICW are proposed for Tymon Park.

The proposed landscape mitigation plan seeks to re-establish pedestrian access by re-aligning paths to meet the embankments and re-profiling areas in a manner that limits impact on trees in the Park. The main flood storage embankment will have a pedestrian path running along the top of it, with the ground re-profiled to meet existing contours and existing paths. Areas for replacement tree planting have been identified within the Park. The final landscaping proposals for Tymon Park are to be agreed with SDCC at detailed design stage.

Where flood embankments are constructed on species-rich dry meadows in Tymon Park, the existing topsoil will be stripped and reserved, and at site restoration will be re-laid on the surface of the embankment and other working areas to allow species-rich meadow to re-establish. It is estimated by the Project Ecologist that it could take 1 to 2 years for these meadows to re-establish, up to 5 years for the lakeside marginal vegetation to re-

establish, and 10 to 20 years for the trees and woodlands to be fully established in the Park.

Additional biodiversity enhancements recommended by the project Ecologist for Tymon Park include the installation of nesting platforms in Tymon Lake and provision of artificial nesting banks for sand martins and kingfisher in and around Tymon Lake. The final landscaping and biodiversity enhancement proposals for Tymon Park are to be agreed with SDCC at detailed design stage.

5.4.2 Whitehall Park

The final re-instatement plan for the green space at Whitehall Park is to create a wildflower meadow by re-laying the topsoil that was stripped from the works areas, and by seeding the area with pollinator plants that are beneficial to insects. This will require some maintenance by occasional mowing as is carried out here currently.

5.4.3 Ravensdale Park

The main objectives of the landscape mitigation plan for Ravensdale Park is to make a feature of the proposed flood wall and integrate it into the Park, to minimise tree loss, to ensure access and visibility through the Park, and to provide replacement tree planting. The landscape mitigation plan makes a feature of the flood walls by integrating seating areas and enhancing the entrances to the Park. The plan includes a reconstructed path in ground concrete finish along the flood wall, terminating in a new paved seating area that will be a focal point in the Park. Various options were suggested for the area of the Park which will be enclosed within the flood walls such as a skatepark, playground or kickabout area. The final landscaping proposals for Ravensdale Park are to be agreed with DCC at detailed design stage.

5.4.4 St. Martin's Drive

The main objective of the landscaping and tree planting plan for St. Martin's Drive were to replace trees that will be lost as a result of the construction of a 1.1m high flood wall along the River here. A tree planting and landscaping plan has been prepared for this works area.

5.5 Land Take

The total land take for the project during the construction phase is approximately 12ha. This takes into account all areas for the proposed works and temporary compounds, construction access and temporary stockpiling areas.

5.6 Geotechnical Investigations

Ground investigations will be carried out as part of the detailed design stage of the project by a specialist contractor. The results of the site investigations may influence the construction methods employed during the construction stage.

5.7 Duration and Sequencing of Construction

It is envisaged that, subject to approval by the Board, construction will commence in Summer 2020 and will take 24 months to complete. There will be six main works areas,

namely Tymon North and Tymon Park; Whitehall Park and Wainsfort Manor Crescent; Fortfield Road; Ravensdale Park and Poddle Park; St. Martin's Drive and Mount Argus, and St. Teresa's Gardens / Donore Avenue / National Stadium. The expected construction duration for each area is given in **Table 5-1**.

After establishing the main works compound in Tymon Park, access tracks and setting out works areas, works will begin in Tymon North and generally move downstream, however the sequencing and duration of works will be dependent on weather and ground conditions. There is a priority to carry out work on the embankment at Tymon Lake and in-stream or adjacent to stream works during low flow periods of May to September.

Table 5-1: Estimated construction programme

Location	Main Flood Alleviation Scheme works	Estimated construction period (cumulative months)
Tymon North and Tymon Park	Establish & maintain main contractor's compound for Scheme duration Tree removal, excavations, demolition of flow control structure, stockpiling earth material, removal and import of earth material, embankments, demolition and replacement of flow control structure incorporating footbridge, ICW, site restoration, landscape mitigation/replacement tree planting, and biodiversity enhancements	24 months 5 months
Whitehall Park / Wainsfort Manor Crescent	Temporary works/set down area, excavations, removal and import of earth material, channel re-alignment and re-grading, flood protection walls, site restoration and biodiversity enhancements	2 months
Fortfield Road	Tree removal, demolition of existing boundary walls, erection of new flood protection walls, site restoration	5 months
Ravensdale Park / Poddle Park	Temporary works/set down area, tree removal, flood protection walls, demolition and replacement of footbridge, landscape mitigation/public realm improvements and replacement tree planting. Works to seal manholes.	3 months
St. Martin's Drive and Mount Argus	Establish secure works area, tree removal, flood protection walls, tree planting	2 months

Location	Main Flood Alleviation Scheme works	Estimated construction period (cumulative months)
St Teresa's Gardens/ Donore Avenue/ National Stadium	Temporary works area, traffic management, road works to rehabilitate or replace existing manholes	2 months

5.8 Construction Management

The Contractor will be obliged to prepare a Project Controls Procedures Manual (PCPM) prior to commencement of the works. The purpose of the PCPM is to define the contract specific strategy for the management and control of the Project and to describe the procedures and policies for its successful completion.

The Contractor will also be obliged to prepare a Construction Environmental Management Plan (CEMP) which will set out proposed measures to mitigate against environmental impacts during the construction and operational stages including the mitigation measures set out in the EIAR. An outline CEMP has been prepared by Nicholas O' Dwyer Ltd. and is contained in **EIAR Volume 4, Appendix 5.1** The outline CEMP will be referred to by the appointed Contractor. The Contractor will take account of all recommendations contained within the outline CEMP and expand as appropriate.

Throughout the progress of the works, the Contractor shall also take account of relevant legislation and best practice UK CIRIA guidance including but not limited to the following:

- C532 Control of water pollution from construction sites: guidance for consultants and contractors;
- SP156 Control of water pollution from construction sites – guide to good practice.

The Contractor's construction method statements shall also indicate how management, monitoring, interception, removal and/or treatment of silt run-off shall prevent contamination of ground or surface waters by mobilisation of soil particles. Fail-safe site drainage shall be provided to prevent discharge of chemical spillage from the construction site. All road and hardstanding areas with potential for contamination shall be drained to a suitable receptor where they can be stored for removal and disposal off-site. The Contactor will be obliged to comply with the mitigation measures which are compiled and set out in **Chapter 17 Summary of Mitigation Measures & Residual Impacts**.

In respect of noise control during the construction works, the Contactor will be obliged to comply with the mitigation measures set out in **Chapter 12 Noise and Vibration** of the EIAR. In respect of dust and air pollution, the Contractor shall be obliged to comply with the mitigation measures set out in **Chapter 13 Air Quality and Climate** of the EIAR.

Mitigation measures identified within each subject area and agreed with the planning authority will be written into the Contract Documents.

In respect of the above, it is noted that the construction will be monitored by a resident engineer and Ecological Clerk of Works (ECoW) to ensure compliance with the Contract Documents and the environmental mitigation measures set out herein.

5.9 Construction Materials

An estimated schedule of principal materials and quantities is presented in **Table 5-2**. In so far as possible, construction materials will be from local sources. All imported material that will be used on site will be procured from approved sources and biosecurity measures will be adhered to.

Table 5-2: Schedule of Principal Materials and Quantities

Description	Tonnes
Concrete	2,700m^3
Reinforcement	300T
Earth material	8,200m^3

All construction products will be required to be subject to the European Union (Construction Products) Regulations 2013 and carry the CE marking. The Construction Products Regulations aim to ensure that reliable performance-related data is made available, by means of Declarations of Performance, in relation to construction products being placed on the European market.

It is envisaged that deliveries of materials will occur on a '*just in time*' basis to reduce the requirement for storage on site. Temporary hard standing areas with drainage to a hydrocarbon interceptor will be constructed before refuelling/servicing activities will be allowed onsite. These areas will be bunded. Temporary bunded and suitably equipped areas will also be in place before any potentially polluting materials (oils, lubricants, solvents, fuel, *etc.*) can be stored on-site. Temporary stockpiling and storage of construction materials will only be allowed in designated areas.

5.10 Waste Management

The wastes expected to arise as a result of construction would be mostly earth from excavations. The project will aim to reuse as much excavated material in the Flood Alleviation project. Any earth material that is removed from the sites will be done in strict accordance with the relevant waste management legislation. For all works, any waste generated during the construction phase will be adequately segregated and stored prior to transfer to an authorised facility for recovery/recycling/disposal.

During the construction phase both solid and liquid waste will be produced at the site. All domestic effluent generated on site will discharge to temporary sewage containment facilities prior to transport and treatment off-site by an authorised contractor. Waste oils

and solvents will be stored in a temporary bunded area prior to transport off-site by a licensed contractor.

5.11 Pest Control

A Pest Control Management plan will be prepared by the Contractor. While pests were not identified during the walkover surveys it is expected that pests and vermin are present on the site owing to the riverine habitat and that pest control management will be required on the site.

Six weeks prior to the commencement of construction the site will be surveyed by professional pest control staff in order to identify the presence and extent of any infestations. Where infestations are identified, appropriate treatments will be implemented to eliminate infestation before construction. A continuous monitoring programme will be implemented throughout the construction period. The control measures will be implemented in accordance with the guidelines on Rodent Control for the Construction Industry issued by the HSE, 2009.

5.12 Best Practice Construction Measures

The construction stage of the project will be managed in accordance with the *Safety, Health and Welfare at Work (Construction) Regulations 2006,* amendments and associated Codes of Practice and international best practice for projects of this type.

A Project Safety Plan will be developed to ensure that the safety of human beings is not impacted on in a negative way by the construction works. The site will be adequately secured to prevent unauthorised access and all visitors to the site will be required to report to the site manager. When implemented, these mitigation measures will not have any additional negative impact on the health and safety of human beings. The Project Supervisor for the Construction Stage (PSCS) will have responsibility for ensuring that relevant health and safety legislation is adhered to and that recommended mitigation measures are implemented.

A CEMP, incorporating best practice environmental measures, will form part of the Construction Management Plan of the proposed development and will adhere to the recommendations and requirements, as detailed in the outline CEMP (**EIAR Volume 4, Appendix 5.1**) and summarised below.

5.12.1 General Pollution Control

Overall pollution control measures, as detailed within the outline CEMP, will be adhered to, including setting out and fencing works area, retaining existing vegetation, and temporary crossings. Any construction waste will be disposed of to a licensed facility by a licensed contractor. Best practice management measures will be implemented when working with concrete.

A project specific Waste Management Plan will form part of the CEMP for the proposed development. The Waste Management Plan will encourage waste minimisation, segregation, reuse and recycling to be adopted for the project where possible. Contaminated ground is not expected to be encountered within the site. However, if it is encountered within ground which has been excavated it will be removed and disposed off-site in accordance with the Waste Management Acts, 1998-2006.

All potentially polluting substances such as oils and chemicals used during construction will be stored in designated storage areas within the works compounds. These will be bunded to a volume of at least 110% capacity of the total volume of liquids to be stored within the bunded area with all filling and draw-off points fully located within the bunded area. Drainage for the bunded area will be diverted for dedicated collection and safe disposal.

Refuelling of machinery will be undertaken at a specified refuelling point at least 15m distant from the River and within a bunded area and hydrocarbon interceptor provided. Lubrication of equipment will also be undertaken in this area.

All domestic effluent generated on site will be discharged to temporary sewage containment facilities prior to transport and treatment off-site.

An Emergency Response Plan will be prepared for the construction period in case of leaks, spills or other incidents that may pose a risk to the surrounding environment. This will include the use of spill kits which will be placed at strategic points within the site.

5.12.2 Groundwater Management

Sump pumps will be used in the excavations to pump water through a siltation control and settlement system.

5.12.3 Tree Felling and Vegetation Clearance

Clearance of any trees or vegetation required will ideally be undertaken outside of the period March 1st to August 31st to avoid impacts to breeding birds. Any felling of trees within the nesting period will be done only under the supervision of the ECoW. Felled trees will be left in-situ for at least 24 hrs to allow bats, if present, to escape prior to sawing/mulching. In some locations, such as at Tymon Park, it may be beneficial for felled trees to remain in-situ to create a habitat for wildlife. Suitable areas for such will be chosen in conjunction with the relevant Councils.

5.12.4 Invasive Species

An Invasive Species Survey was carried out by NM Ecology. Precautions will be taken not to spread non-native plants into adjacent watercourses as described in **Chapter 7 Biodiversity** of this EIAR. Good construction site hygiene will be employed to prevent the spread of invasive species.

5.12.5 Noise and Vibration Mitigation Measures

The contractor will be required to implement the control measures recommended in BS 5228 and apply the appropriate measures as described in **Chapter 12 Noise and Vibration** of this EIAR.

5.12.6 Air Quality Mitigation Measures

A Dust Management Plan will be developed and implemented. Particular attention will be paid to the mitigation measures detailed in **Chapter 13 Air Quality and Climate** for vehicle movements within the site and stockpiling operations. The objective of these procedures is to minimise the creation and release of dust. A Dust Management Plan will

be implemented by the contractors at all times and special importance will be placed on these measures on high wind days.

5.12.7 Traffic Management

A detailed Construction Traffic Management Plan will be developed and agreed with each Council's Roads Authorities and implemented at the commencement of the works. The plan will identify the traffic routes to the works sites, and the routes will be marked with warning signs in accordance with the requirements of the Councils' Roads Authorities. The Construction Traffic Management Plan will be reviewed and updated regularly to take into account changing patterns of both the existing traffic and the construction traffic following consultation with Roads Authorities. It is not anticipated that the works will require exceptional loads. However, if required the routing of exceptional loads will be done in with the relevant Local Authorities and An Garda Síochána. Traffic issues associated with the construction phase of the development are addressed in **Chapter 14 Traffic and Transport** of the EIAR.

5.12.8 Construction Working Hours

Construction activities will take place Monday to Friday, between 07:30 and 16:30, and as may be required on Saturdays from 08.00 hours to 13.00 hours. Evening and night-time work is not expected to take place, although it is possible that limited 24 hours working may be required on occasion. This will only take place with the prior agreement of SDCC and DCC.

5.12.9 Summary

The above is a summary of the best practice construction and biosecurity measures to be employed by the contractor. A schedule of all mitigation measures to be implemented as part of this Scheme are included in **Chapter 17 Schedule of Mitigation Measures** of the EIAR and in the **Outline CEMP** contained in **EIAR Volume 4, Appendix 5.1**.

5.13 Climate Change Considerations

The effects of climate change were taken into consideration in the design of the proposed Flood Alleviation Scheme. Various climate change scenarios were run in the hydraulic modelling to test the resilience of the Scheme. The purpose of this testing was to check flood levels and defence freeboard. For example, a threshold check was carried by running the modelling with no blockages in all culverts and a 20% increase in peak rainfall. This test resulted in a marginal increase in flood levels in Tymon Lake with a net decrease downstream.

In the final design a freeboard of 500mm for embankments and 300mm for walls has been added to the proposed flood defence heights to allow for failure of the defences or overtopping in an event greater than the 1% AEP, and to allow for climate change in accordance with OPW policy. All structures in the Scheme are designed with foundations such that they will be capable of being raised in the future to account for climate change.

5.14 Risk of Major Accidents and/or Disasters

In carrying out this EIA, the project team have considered scenarios of accidents and / or disasters that could occur during the construction and operational phases of the project.

Every effort has been taken in the design of the Flood Alleviation Scheme, and best practice mitigation measures will be instituted by the Contractor, to ensure protection of the environment during construction and operation of the Scheme in order to reduce or prevent the risk of major accidents and/or disasters.

5.14.1 Failure of the Flood Storage Embankment at Tymon Lake

Although the flood storage embankment is designed following rigorous reservoir analysis and testing, according to best international practices and standards under the supervision of a UK All Reservoirs Panel Engineer, the scenario of a failure of the flood storage embankment at Tymon Lake has been assessed qualitatively for its potential impacts. In the event of a structural failure, the volume stored behind the embankment would be released and flood the neighbourhoods immediately downstream of Tymon Park. The flow control structure is likely to still be functioning in that event, but a sudden release of water would result in severe flooding of the residential properties in the path of the released flood waters. The additional flood storage at Whitehall Park and Ravensdale Park would provide a degree of attenuation and help in alleviating the effects of a sudden surge of water further downstream in such an extreme and unlikely event.

5.14.2 Overtopping the Flood Defence Structures

The proposed Flood Alleviation Scheme is designed for a 1% AEP event. The flood storage embankment will act as a spillway in events exceeding the 1% AEP event, controlling the release of excess water above the 1% AEP volume from the storage area and ensuring the embankment does not fail up to and including the Probable Maximum Flood event. Any water released over the spillway in events exceeding the 1% AEP event would cause localised flooding in Tymon Park extending towards the Osprey and Willington estates. However, this flooding would be much less than that which would occur in the absence of the storage area, and it is only the exceedance volume above the 1% AEP volume which would be released.

Release of excess volume over the spillway in events of greater magnitude than the design 1% AEP event is not a failure of the Scheme.

5.14.3 Failure of the Flood Walls

Another scenario is that the flood protection walls that are constructed or replaced in the Scheme fail by collapse or undermining, thereby causing flooding in adjacent properties. Existing walls along the River have been structurally assessed for their flood protection capability, and the walls to be replaced have been identified in this Scheme. To overcome this potential, a robust programme of maintenance will be instituted to check the walls periodically and carry out any remedial works.

5.15 Operation of the Proposed Scheme

In flood conditions, the flow control structure in Tymon Park will restrict flow from Tymon Park lakes to a maximum of 748l/s which is the equivalent of the 2-year return period flow. In storm events of greater magnitude than a 2-year return period the excess volume of floodwater will fill the storage area in Tymon Park lakes and be contained by the flood storage embankment. A storage volume of 66,000m^3 will be provided, which is sufficient to accommodate the attenuated volume in excess of the 100-year return period event.

Downstream of Tymon Park, the River will be contained in channel by the proposed flood walls. In Ravensdale Park, once the capacity of the culvert at the downstream end of the Park has been exceeded, excess volume in the region of 800m^3 will be stored within the Park and will begin re-entering the culvert once the flood levels recede.

The Scheme also includes an ICW, which purpose is to improve water quality in the River. The ICW is a biological system designed to take the water from the River at a flow rate of 15l/s through the baffles, then through dense vegetation where it is exposed to biological, chemical, and physical processes that reduce the concentrations of pollutants. These pollutants remain within the wetland area where many are broken down to become a source of nutrients to the resident biological communities. Other dissolved contaminants such as heavy metals which are not utilised become embedded in the underlying sediment by adsorption processes and thus do not enter river water. Water leaving the ICW at the downstream end will be of a higher quality characterised by a lower pollutant profile and increased oxygen levels.

An important element of the operation of the Scheme is its ongoing maintenance. The section following describes the existing maintenance regimen in operation by each Council, and the proposed measures which will be instituted as part of the Flood Alleviation Scheme.

5.16 Maintenance of the Scheme

5.16.1 Existing measures

Following the flood of October 2011 level alarms and CCTV were installed at the Lakelands overflow weir, Wainsfort Manor culvert, and Gandon Close. These alarms notify SDCC/DCC Drainage Departments when water levels rise to a certain point which might indicate a blockage or obstruction at the culvert inlet screen. It was noted in the post flood review after the 2011 event that better co-ordination was required between SDCC and DCC Drainage Departments in providing quick organised responses to flood events.

In addition to responding to potential flood events, the issue of channel maintenance and cleaning is a critical factor in reducing flood risk. Tree and garden cuttings, fly-tipping and general dumping of discarded furniture and white goods into the river channel is unfortunately a common occurrence in the River Poddle and is well highlighted from discussions with local residents and also from some local community groups such as the Crumlin Cleanup Committee. In addition to the flood risk, this poses both ecological risk to the riverine habitats from pollution but also a health and safety risk for those tasked with their removal.

The current maintenance programme for both local authorities is described below.

5.16.1.1 SDCC

- Once a year at the end of August the river channel it is completely unchoked by hand. Crews walk the stretch from Tymon Lakes to the screen at Kimmage Manor. Water level monitors which are linked to automatic alarms to SDCC personnel in addition to cameras (CCTV) was also installed at this location and at Lakelands overflow weir.

- The inspectors check the screens along this section once a week, if there is material on them it is removed.

- There was a pre-screen added in 2015 at the green space adjacent to Templeville Road.

5.16.1.2 DCC

- All existing screens are cleaned on Monday and Friday every week or before forecasted heavy rain.

- Any other observed large debris such as cars, trees or tree branches, etc is removed from the river. Any reports of large debris in the river or fly tipping are investigated.

- The screen in Gandon Close was modified after the flood of 2011 and a second debris screen was installed upstream. The upstream screen has water level monitors upstream and downstream which are linked to automatic alarms to DCC personnel. A camera (CCTV) was also installed at this location

5.16.2 Proposed Measures

When the Flood Alleviation Scheme is complete a robust programme of maintenance will be instituted by each Council to ensure that culvert screens and channels are kept clear of debris and the Flood Alleviation Scheme functions properly during a storm event. The maintenance works include carrying out repair works on existing walls and clearing vegetation and debris that has accumulated in the channel. A register of the flood defence assets in SDCC and DCC areas will be compiled as part of the Scheme to ensure that no subsequent developments remove or alter the flood defence asset without SDCC/DCC review. Flood defences will be incorporated into the development plans for both authorities to ensure that defences that are erected will not be removed as part of any future development either by a local resident or as part of a planning submission.

In addition to routine planned maintenance, greater public awareness is required to educate and inform local communities of the risks and consequences of illegal dumping and to provide contact details to alert the local authorities when this has occurred. The duty of the local authority in this regard is to respond adequately in a timely fashion.

5.17 Benefits of the Proposed Flood Alleviation Scheme

The proposed Scheme will prevent flooding from the River Poddle for flood events up to and including the 100-year Return Period event, providing protection for approximately 921 properties in SDCC and DCC areas, where currently there are 1,377 properties at risk.

While the purpose of the Scheme is to address the fluvial flood risk from the River Poddle specifically, the reduction of river levels due to the flood storage in Tymon Park will have localised benefits for some areas at risk from pluvial flooding (i.e. Perrystown/Whitehall, Mount Argus Road and The Coombe) by reducing flood depths. These areas will benefit from the works to be undertaken by the relevant local authorities on foot of this Scheme to improve the surface water drainage.

Whilst its primary purpose is flood protection, the River Poddle Flood Alleviation Scheme will also deliver added benefits of biodiversity enhancement, improved water quality, and improvements to the public realm. This will be achieved through re-planting of trees on a 2 for 1 basis, introduction of an ICW in Tymon Park to improve water quality, and biodiversity enhancements in Whitehall Park green space where the re-aligned channel

will also increase visibility of the river. The works at Ravensdale Park will allow an opportunity to add amenity value to the Park with informal seating areas proposed along the new wall. The maps showing the areas benefitting from the reduction of flood risk are shown in **EIAR Volume 3.**