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Living 
With Water
Programme



2023

A VISION FOR LIVING WITH WATER IN DERRY/LONDONDERRY

Derry/Londonderry Strategic Drainage
Infrastructure Plan

LIVING WITH WATER IN DERRY/LONDONDERRY



PROTECT
ENHANCE
GROW



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EXECUTIVE SUMMARY

THE NEED FOR CHANGE

Drainage and wastewater infrastructure in many areas throughout Northern Ireland is currently inadequate to meet the requirements expected of it. This is the case in Northern Ireland's second largest city – Derry/Londonderry.

The Northern Ireland Executive's 2020 New Decade, New Approach Deal recognised the importance of investing in drainage and wastewater infrastructure. The document states:



The Executive will invest urgently in wastewater infrastructure which is at or nearing capacity in many places across Northern Ireland, limiting growth



We all 'live with water', so we all have a stake in delivering a long-term, integrated solution for our drainage and wastewater management needs. The drainage of surface water and the effective treatment and management of sewage are essential for good public health, economic growth, and a healthy, natural environment. It is also needed to support development of homes, schools, hospitals, commercial businesses, and industry.

THE LIVING WITH WATER PROGRAMME

The Living With Water Programme (LWWP), is an interdepartmental group being led by the Department for Infrastructure (DfI) in Northern Ireland.

The LWWP supports an approach to the provision of drainage and wastewater infrastructure that promotes holistic and integrated solutions. It provides multiple benefits whilst minimising cost and disruption compared to traditional methods.

An example of this approach is using open spaces and watercourses to sustainably manage water and reduce flood risk, while enhancing the environment and promoting recreational opportunities. This is commonly referred to as blue/green infrastructure.

In addition to blue/green infrastructure it is recognised that significant investment is also required in more traditional "hard engineered" infrastructure, like sewers, pumping stations, river/coastal flood defences, and upgrades to our wastewater treatment works.

LIVING WITH WATER IN DERRY/LONDONDERRY

In 2021, DfI announced the development of a Strategic Drainage Infrastructure Plan (SDIP) for Derry/Londonderry to:

- **Protect** against flooding by managing the flow of water through a catchment from source to sea.
- **Enhance** the environment through effective wastewater management and the provision of enhanced "blue/green" spaces to benefit local communities.
- **Grow** the economy by providing the necessary capacity in our drainage and wastewater management systems to facilitate new development projects, including house building.

The LWWP met with potential stakeholders and through early engagement, identified pressures and issues within the city and surrounding areas. Overlapping or interlinked pressures and issues that require a coordinated multi-agency response will form the basis for developing the SDIP.

This document, entitled "A Vision for Living With Water in Derry/Londonderry" (hereafter referred to as the "Vision"), is a precursor to the SDIP, and outlines the approach being undertaken by DfI to work collaboratively with various stakeholders from across central and local government and the private sector, to develop integrated and sustainable drainage solutions across the city and surrounding areas.

The SDIP will also support the city and surrounding areas to adapt to a changing climate and to contribute towards meeting the targets and legislative requirements outlined in Chapter 2. Further to this, it will coordinate and optimise the strategic planning of future drainage and wastewater related works in the Derry/Londonderry area.

The Vision therefore explains the challenges involved, the opportunities for potential solutions and outlines the need for a SDIP. It also gives stakeholders the opportunity to provide input to inform the SDIP as it develops.

NEXT STEPS/KEY OUTPUTS

The next step is to understand these pressures and issues in greater detail, including an assessment of root causes for inclusion in the SDIP. This will be done through further data analysis and engagement with stakeholders.

Following further engagement, the key outputs to be delivered through the LWWP are expected to include:

- A SDIP, to identify investment needs to solve drainage and wastewater problems including;
 - the extent of pressures on existing drainage infrastructure in Derry/Londonderry
 - potential solutions to address the issues including consideration of potential blue/green solutions
 - opportunities for collaboration and integrated solutions
- A Strategic Environmental Assessment (SEA) and Habitats Regulations Assessment (HRA) completed alongside and informing the development of the SDIP.
- A review of the impact of the proposed SDIP in terms of regulatory and rural needs on equality of opportunity and the potential need for an Equality Impact Assessment (EQIA).
- A draft SDIP will be made available for public consultation prior to the publication of the finalised SDIP.

CHAPTER 01. INTRODUCTION

1.1 THE LIVING WITH WATER PROGRAMME

Drainage and wastewater infrastructure in many areas throughout Northern Ireland is currently inadequate to meet the requirements expected of it. This is the case in Northern Ireland's second largest city – Derry/Londonderry where there have been a number of flooding events in recent years. Current issues are likely to be exacerbated as a result of climate change and this could impact upon future growth plans for the city. To address these issues, the Department for Infrastructure (DfI) announced plans in 2021 to develop a Strategic Drainage Infrastructure Plan (SDIP) for the city and surrounding areas, delivered as part of DfI's Living With Water Programme (LWWP).

The main aims of the SDIP are to:

- **Protect** against flooding by managing the flow of water through a catchment from source to sea.
- **Enhance** the environment through effective wastewater management and the provision of enhanced blue/green spaces to benefit local communities.
- **Grow** the economy by providing the necessary capacity in our drainage and wastewater management systems to facilitate new development projects including house building.

The LWWP an interdepartmental group being led by DfI is leading the development of SDIP by working collaboratively with various stakeholders from across central and local government and the private sector. The LWWP promotes a holistic and integrated approach to future drainage and wastewater management.

The LWWP was originally established deliver the Belfast SDIP.

The Belfast SDIP – 'Living With Water in Belfast', was published in November 2021, and the LWWP team is currently working through the delivery phase of the

programme for Belfast. The LWWP team will adopt a similar approach to develop the Derry/Londonderry SDIP as the one used for Belfast.

1.2 LIVING WITH WATER AIMS

In accordance with the principles set out in [Sustainable Water – A Long-Term Water Strategy for Northern Ireland \(2015-2040\)](#) published by DfI in March 2016, the key aims for Living With Water are to:

Key Aims of Living With Water in Derry/Londonderry

1.	Reduce flood risk in compliance with the Floods Directive (Protect)
2.	Maintain and achieve environmental compliance by improving the quality of water in the rivers and waterbodies including Lough Foyle (Enhance)
3.	Support economic growth by enabling development (Grow)
4.	Maintain essential drainage and wastewater assets
5.	Adapt to climate change by providing increased resilience
6.	Where possible as part of the solutions, provide new and improved amenity benefits to the community
7.	Reduce the burden of operational costs relating to drainage and the provision of wastewater services
8.	Determine the most cost-effective solutions through integrated investment planning

1.3 THE NEED FOR THE SDIP

Drainage and wastewater infrastructure is central to supporting every aspect of our society. Most of this is hidden beneath our towns and cities and usually goes unnoticed. However, much of the ageing infrastructure in Derry/Londonderry needs upgraded and requires significant levels of additional investment.

Initial exploratory work was undertaken to understand the scale and extents of the pressures and issues that exist across the city, alongside early consideration of potential opportunities for collaboration.

Derry/Londonderry has the second highest level of flood risk amongst the 12 Areas of Potential Significant Flood Risk (APSFR) in Northern Ireland, as identified in the [Northern Ireland Flood Risk Assessment \(NIFRA\) 2018](#). Flood risk stems from fluvial, pluvial, and coastal sources, and could adversely impact people and property in the area. The most prominent flooding source is pluvial flooding which poses risk to property, key infrastructure, and cultural heritage. NIFRA 2018 figures state that the Aggregated Annual Average Damage (AAAD) for Derry/Londonderry equate to £5.56 million. In other words, on average, flooding causes £5.56 million worth of damage in the area every year.

The capacity of wastewater networks and the treatment works in the city are constrained. As a result, NI Water has already had to provide negative responses to some planning consultations due to capacity issues in parts of the wastewater network. Large scale development plans at various locations across the city have the potential to put further pressure on these systems. NI Water will continue to provide connections for developments with previously approved planning. However, adverse impacts, including increased flooding instances and water quality issues, are likely to be intensified by the effects of ageing infrastructure and climate change.

There is ongoing work by NI Water and DfI to identify these issues and address them, including modelling studies, sewer upgrade schemes and potential flood alleviation schemes. Nonetheless, as these issues are likely to be made worse by future changes, more needs to be done.

This Vision seeks to outline the complex nature of the issues associated with drainage and wastewater infrastructure, setting out the need for a SDIP. It is anticipated that the SDIP will consider the potential solutions to address these challenges and the likely scale of investment required to address the city's drainage and wastewater needs.

CHAPTER 01. INTRODUCTION

1.4 STUDY AREA BOUNDARY

Figure 1 provides an illustration of the potential geographical scope of the SDIP. This covers the areas that are considered to contain significant overlapping or interlinked pressures and issues, such as flooding, water quality issues and growth plans, based on initial engagement with the LWWP stakeholders.

The study area boundary will be confirmed through the development of the SDIP.

Due to the geographical extents of the study area being considered, the transboundary impacts on the Republic of Ireland will also be considered, and opportunities for cross-border collaboration will be assessed through development and delivery of the SDIP.

1.5 PURPOSE OF THIS DOCUMENT

The purpose of this document is to help explain the high-level challenges involved and to outline the approach being taken to develop the SDIP.

1.6 STAKEHOLDER ENGAGEMENT

The views of stakeholders are considered a central aspect to development of the SDIP. To establish the Vision and inform its development, the LWWP engaged with potential stakeholders at the outset to initially identify pressures and issues within the city and surrounding areas.

This document aims to inform and encourage further stakeholder engagement. We intend to engage with key stakeholders during the development of the SDIP. Wider views will be sought through the SDIP consultation process.

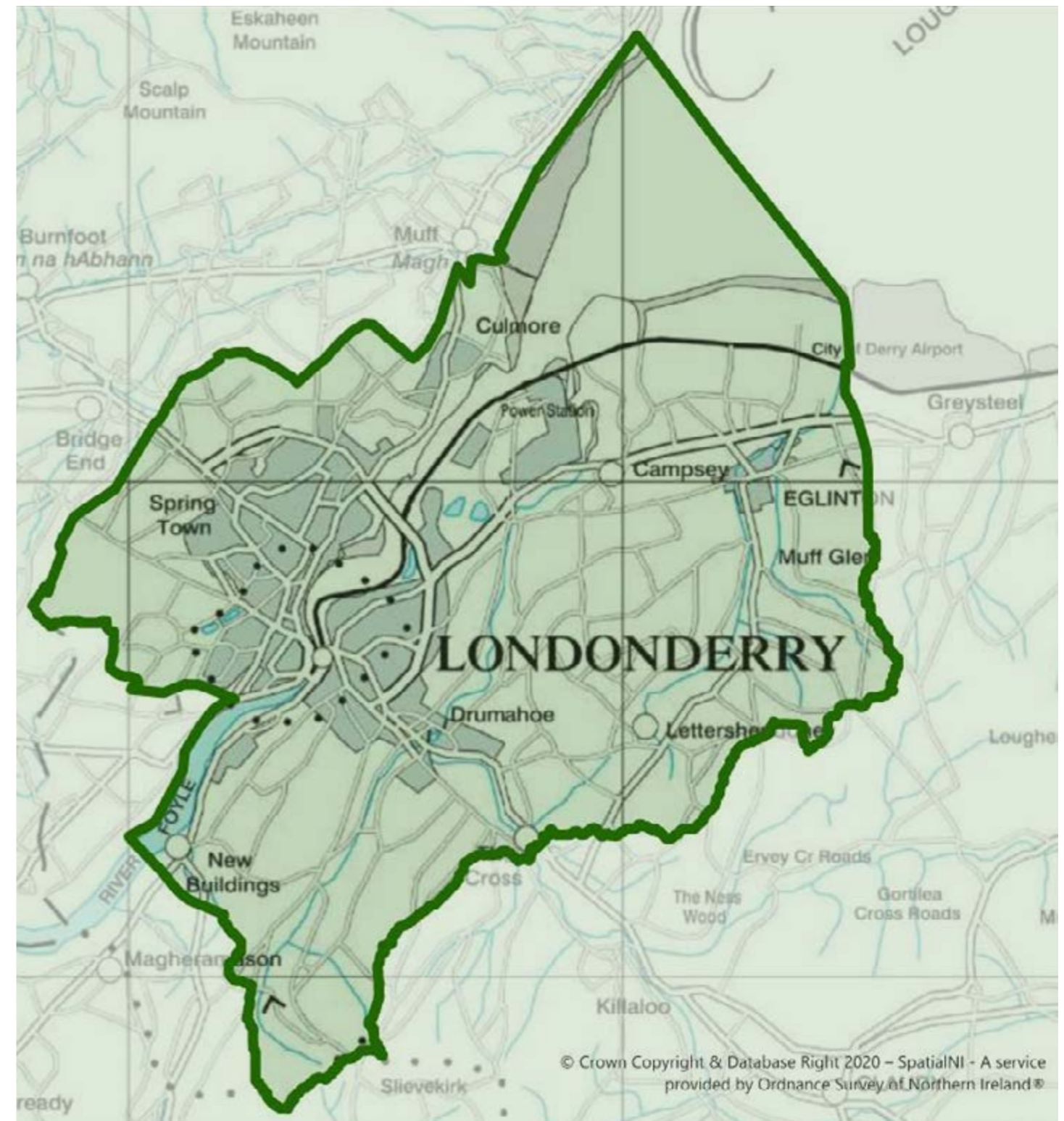


Figure 1 - Potential geographical scope of the SDIP

CHAPTER 02. BACKGROUND AND STRATEGIC CONTEXT

2.1 BACKGROUND

Every day we rely on a vast drainage network, much of which is hidden beneath our towns and cities and usually goes unnoticed. It is only during times of flooding that the capacity and resilience of this “invisible” infrastructure comes into the spotlight. Derry/Londonderry has experienced a number of serious flooding events in recent years such as those that occurred in August 2017, and July 2022. The consequences for those living and working in the affected areas have been severe, including resultant property damage, infrastructure loss and significant economic disruption.

As the economy, population and tourist numbers continue to grow, and climate change results in more intense rainfall, the ageing drainage infrastructure in the city and surrounding area will continue to come under even greater pressure. This could lead to:

- Reduced capacity within drainage and wastewater infrastructure leading to development restrictions for construction of new homes, businesses, industry, hospitals, and schools.
- Reduced capacity within drainage and wastewater infrastructure leading to more frequent and more severe flooding.
- Increased instances of drainage and wastewater infrastructure failure such as sewer collapses and blockages.
- Additional cost of pumping and treating ever-increasing volumes of rainwater mixed with sewage to Wastewater Treatment Works (WwTW) for treatment.
- More frequent spills from sewerage overflows causing pollution in our inland and coastal waters.

Due to the complex nature of drainage problems, no single organisation can tackle these alone. This new integrated approach to drainage and wastewater management is needed to address these inter-related problems.

Further details on the need for investment, are provided in Chapter 4.

2.2 STRATEGIC CONTEXT

It is essential that we have a sustainable water sector that contributes to achieving the [United Nations Sustainable Development Goals \(SDGs\)](#) whilst supporting economic growth in line with the [Northern Ireland Regional Development Strategy 2035 \(RDS\)](#).

Northern Ireland must meet the requirements of a number of Directives designed to protect and improve the quality of the water environment, such as the Water Framework Directive (WFD), Urban Waste Water Treatment Directive (UWWTD), Bathing Waters Directive, Groundwater Directive, and Floods Directive. It is important to note that the requirements of these Directives have been transposed in United Kingdom law following the UK's exit from the European Union.

The LWWP is central to the delivery of the Floods Directive, WFD, the United Nations SDGs, the Northern Ireland RDS, and the Long-Term Water Strategy as illustrated in Figure 2.

The Long-Term Water Strategy for Northern Ireland, focuses on complying with these Directives by setting out a range of initiatives to deliver the long-term goal of a sustainable water sector. It encourages a sustainable and integrated approach to managing the various water needs in a way that promotes regional development, without compromising the environment or increasing flood risk. The Long-Term Water Strategy seeks to develop cross-departmental working and stakeholder partnerships and references

the need for guidance to develop strategic drainage infrastructure plans across Northern Ireland.

In addition to contributing to these international and regional strategies, the LWWP must contribute to the local development and community plans of Derry City and Strabane District Council (DCSDC). This includes alignment with the [DCSDC City Deal & Inclusive Future Fund](#), [Green Infrastructure Plan](#), [Climate Change Pledge Action Plan](#), [Local Development Plan](#), and [Inclusive Strategic Growth Plan \(2017-2032\)](#).

In November 2021, the Northern Ireland Assembly approved the publication of Living With Water in Belfast, an Integrated Plan for Drainage and Wastewater Management in Greater Belfast.

The Northern Ireland Assembly declared a climate emergency in February 2020. Key issues that must be addressed include the need for infrastructure to be adapted to cope with more intense rainfall and reduce and mitigate against the effects of increased greenhouse gas emissions.

Subsequently, the Climate Change Act (Northern Ireland) 2022 received Royal Assent in June 2022. It sets out the legal framework for tackling climate change. Northern Ireland (NI) Water is one of the largest electricity consumers in Northern Ireland, and therefore energy use and the roles of all stakeholders in the decarbonisation of the energy system need to be considered. Through the SDIP, there will be a considerable opportunity to align with the Climate Change Act (NI) 2022 in the context of contributing to Net Zero greenhouse gas emissions by 2050 and through adaptation to climate change.

2.3 ENVIRONMENTAL CONTEXT

A Strategic Environmental Assessment (SEA) will be prepared alongside the development of the more detailed SDIP, in accordance with the Environmental Assessment of Plans and Programmes Regulations (Northern Ireland) 2004 (S.R. 280/2004). This will ensure that environmental considerations are integral to the plans and programmes developed as part of the SDIP and will act as a means of ensuring that a high level of protection is afforded to the environment and sustainable water management is promoted.

The Vision is considered as a precursor to the SDIP, outlining the approach that will be taken. Whilst the wider environmental objectives will guide this work from the outset, the need for a stand-alone SEA to be produced for this high-level Vision document is not considered necessary.

A Habitats Regulations Assessment (HRA) will also be undertaken for the SDIP, in accordance with [The Conservation \(Natural Habitats, etc.\) Regulations \(Northern Ireland\) 1995](#).

01

LONG TERM WATER STRATEGY

The Long-Term Water Strategy's flood risk vision is to:

"manage flood risk and drainage in a sustainable manner to facilitate social, economic and environmental development."

This Vision is translated into the following five strategic aims:

1. Deliver Sustainable Flood Resilient Development;
2. Manage the Catchment to Reduce Flood Risk;
3. Provide Sustainable Integrated Drainage in Rural and Urban Areas;
4. Improve Flood Resistance and Resilience in High Flood Risk Areas; and
5. Be Prepared for Extreme Weather Events.

These aims are about proactively reducing flood risk by making space for water through land-use planning, catchment management and by making best use of existing drainage and blue/green infrastructure.

The Strategy suggests that a framework must be put in place that ensures drainage providers work openly and collaboratively to achieve this. Such an approach will help make investment more effective and reduce the future costs of maintaining and operating drainage and wastewater infrastructure. This is the crux of integrated urban drainage and is what LWWP is all about - making the best use of the finite resources available to manage surface water in an effective and sustainable manner.



02

REGIONAL DEVELOPMENT STRATEGY

The (RDS) is the spatial strategy of the Northern Ireland Executive which informs the spatial aspects of the strategies of all Government Departments in Northern Ireland. Council Local Development Plans and development schemes are required to 'take account' of the RDS by considering how they might:

- Promote a more sustainable approach to the provision of water and sewerage services and flood risk management.
- Integrate water and land-use planning.
- Manage future water demand.
- Encourage sustainable surface water management.

One of the strategic aims of the RDS is to: **Strengthen Belfast as the regional economic driver and Londonderry as the principal city of the North West.**

06

WATER FRAMEWORK DIRECTIVE

Our unique natural environment is important to all of us and is something we need to nurture. It enhances our everyday lives by promoting our health and well-being, encouraging economic growth and tourism and helping to tackle the social issues which often develop in run down areas.

The WFD establishes an integrated approach to the protection, improvement and sustainable use of water bodies.

The WFD also includes Shellfish Water Protected Areas which must be protected and improved to contribute to the high quality of shellfish products harvested for human consumption from licensed aquaculture beds.

The UWWTD is one of a number of existing directives that sit below the WFD and its objective is to protect the environment from sewage pollution through the effective collection, treatment and discharge of waste water. The Directive sets treatment levels based on the size of population (population equivalent) served by the sewerage system and the sensitivity of waters receiving their treated discharges.

05

UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS

The 17 SDG's were formally agreed by the UN at the Sustainable Development Summit in New York in September 2015, and came into effect from January 2016. The Goals are an internationally agreed set of global high level targets relating to international development to tackle poverty and inequality.

03

FLOODS DIRECTIVE

The Floods Directive requires Member States to establish a framework for the assessment and management of flood risks that aims to reduce the adverse consequences of flooding on human health, the environment, cultural heritage and economic activity. While many areas may be at risk of flooding, the Directive requires areas at significant risk to be identified and looked at in more depth.

An Area of Derry/Londonderry has been identified as an APSFR that requires a Flood Risk Management Plan (FRMP) to be developed and that area falls within the scope of this Plan.

04

CLIMATE CHANGE ACT (NORTHERN IRELAND) 2022

The Northern Ireland Assembly passed its first ever Climate Change Legislation in March 2022. The Climate Change Act (Northern Ireland) 2022 sets out the legal framework for tackling climate change by reducing greenhouse gas emissions for decades to come. The Climate Change Act legally requires that all Northern Ireland Departments contribute to delivering its targets, carbon budgets and climate action plans. Strong collaboration is needed to achieve this.

FIGURE 2. BACKGROUND AND STRATEGIC CONTEXT

CHAPTER 03. OVERVIEW OF EXISTING INFRASTRUCTURE

When it rains, some of the water naturally seeps into the earth or makes its way directly to a watercourse. The rest finds its way via a network of underground pipes, into rivers and estuaries and finally into Lough Foyle. Some of this water is carried by separate storm drains and pipes and some flows into the sewers and is carried along with sewage to a WwTW. We rely upon a vast network of drainage and flood defence infrastructure, including: rivers, culverts and weirs; sewers, WwTWs and pumping stations; road gullies and drainage pipes; waterways and canals; lakes, loughs and reservoirs; green infrastructure (parks, open spaces); and coastal and river flood defences.

This graphic provides examples of some of the existing infrastructure within Derry/Londonderry.

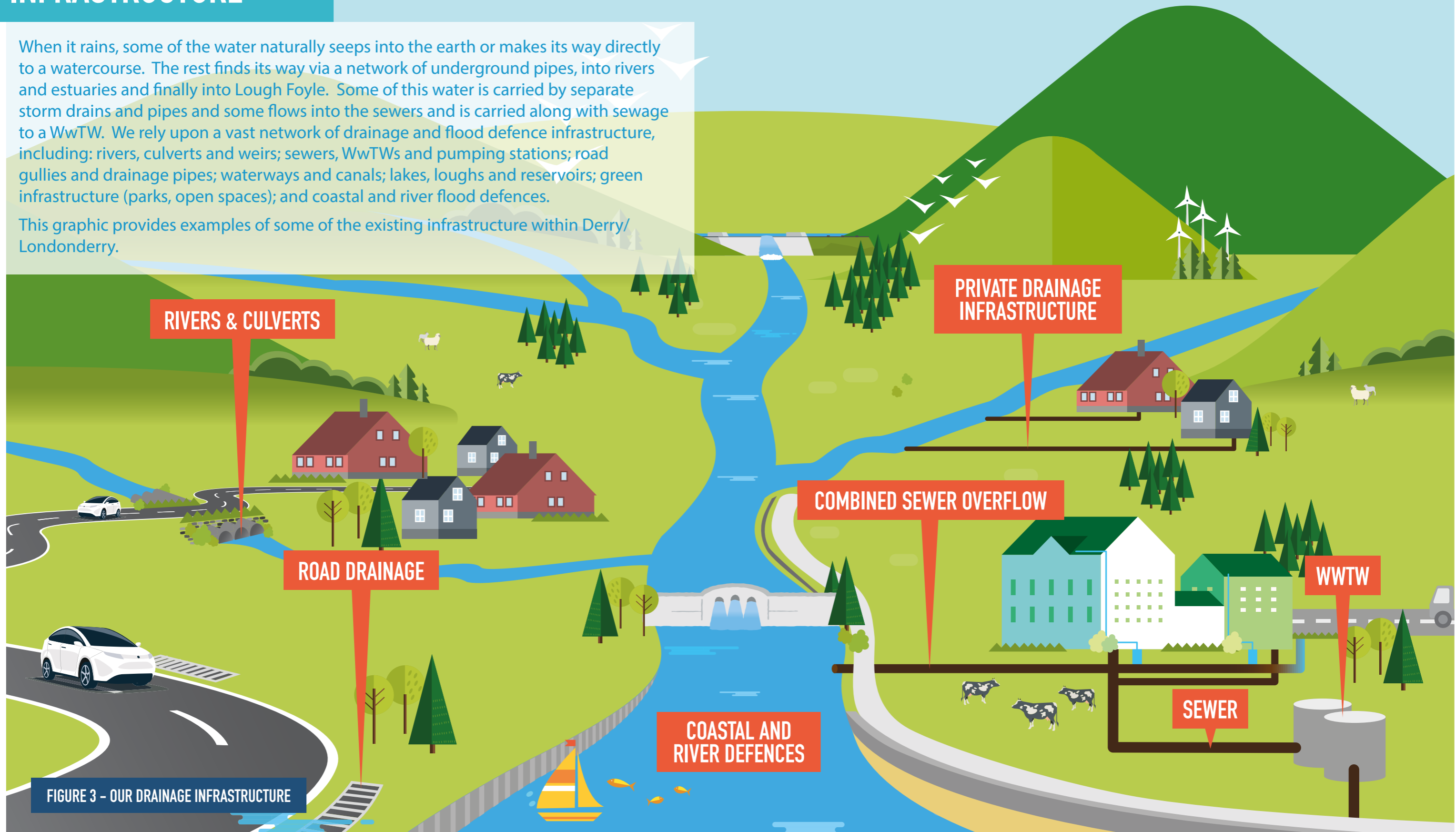


FIGURE 3 - OUR DRAINAGE INFRASTRUCTURE

CHAPTER 03. OVERVIEW OF EXISTING INFRASTRUCTURE

3.1 HOW IT ALL WORKS

The policy, regulation and funding of drainage and wastewater management in Northern Ireland is currently provided by a number of different organisations.

Organisation	Relevant Responsibilities
Department for Infrastructure (DfI)	<ul style="list-style-type: none"> Water and drainage policy, funding, and legislation. Road drainage (parts of which discharge into NI Water sewers). Flood risk management planning under the Floods Directive. Planning policy and strategic planning. Management and maintenance of the free flow of water in all watercourses that have been designated by the Drainage Council. Management and maintenance of designated flood defences.
Department of Agriculture, Environment and Rural Affairs (DAERA) / Northern Ireland Environment Agency (NIEA)	<ul style="list-style-type: none"> Wastewater policy and legislation. Environmental standards and regulation. River basin management planning under the WFD.
NI Water	<ul style="list-style-type: none"> Ownership, management and operation of some reservoirs and their associated catchments (NI Water is the second biggest landowner in Northern Ireland). Surface water collection associated with its Licence. Wastewater collection (via combined and foul sewers) and treatment.
Northern Ireland Authority for Utility Regulation (NIAUR)	<ul style="list-style-type: none"> Economic regulation of NI Water's activities relating to the provision of water and sewerage services.
Local Councils	<ul style="list-style-type: none"> Development control and planning. Ownership, management and operation of some ponds, lakes, and reservoirs. Community assets including parks and other public spaces.

Whilst most of the existing drainage and wastewater infrastructure is managed and operated by these public bodies, some is the responsibility of private landowners. This can cause significant problems if it is not maintained adequately in critical locations.

Additionally, surface water management is not the responsibility of any single organisation listed above. This complex issue requires a collaborative approach to management.

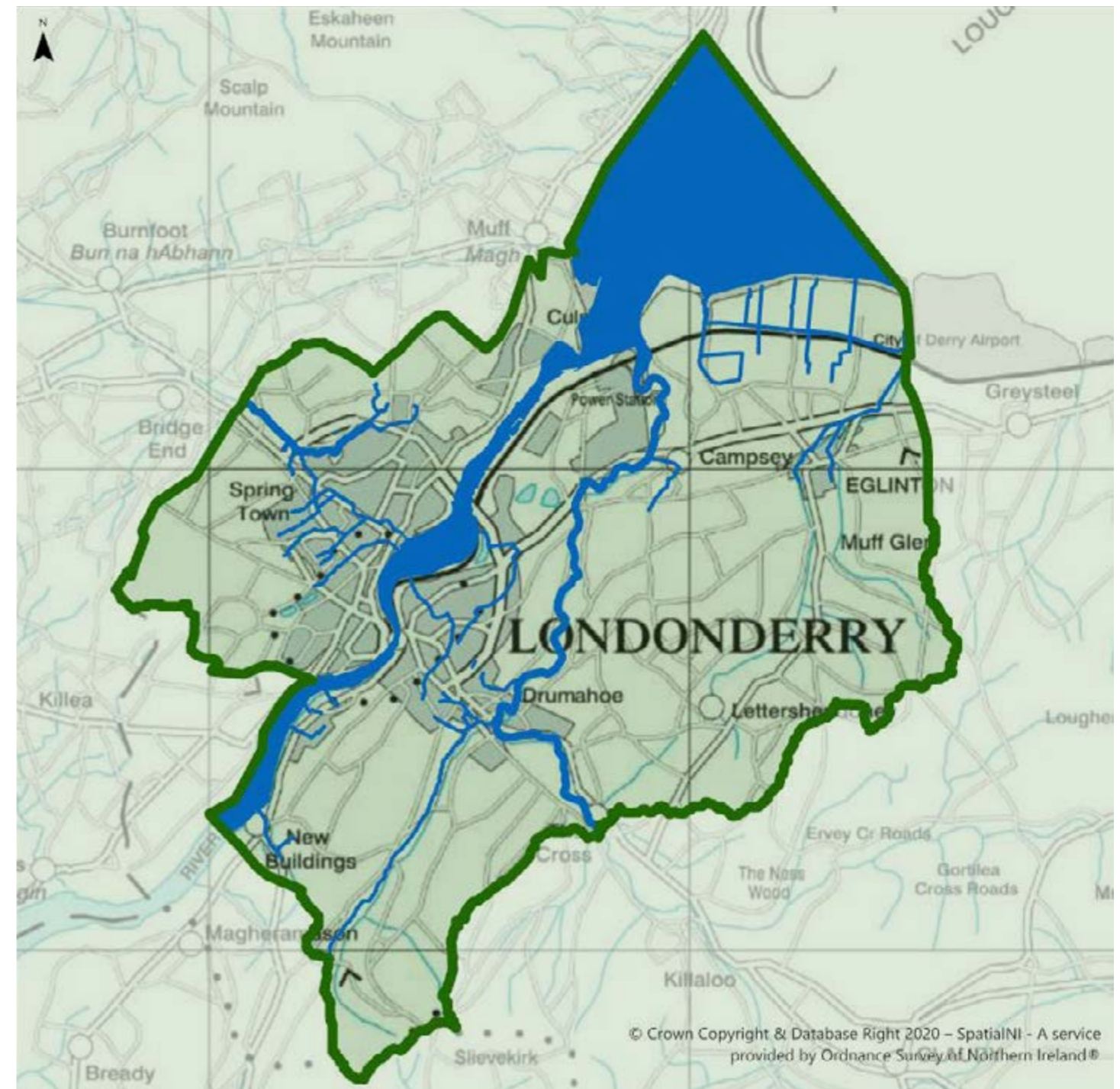


Figure 4 - Main Derry/Londonderry watercourses in potential SDIP area

3.2 WATERCOURSES & FLOOD DEFENCES

Figure 4 shows the main watercourses (open and culverted (piped)) within the Derry/Londonderry area. Each of these has the potential to flood during periods of prolonged heavy rainfall.

Many of the watercourses, particularly those in urban areas, are culverted, which further limits their capacity for taking additional flows.

Derry/Londonderry has no formal sea defences, however the banks/quays act as a form of coastal defence that provides limited protection to the low-lying areas of the city. Studies are being undertaken by DfI Rivers to identify potential flood risk and consider options to mitigate against fluvial and tidal flooding.

CHAPTER 03. OVERVIEW OF EXISTING INFRASTRUCTURE

3.3 ROAD DRAINAGE

The drainage of public roads, footways, and certain public realm areas is the responsibility of DfI Roads. These hard surfaces are usually drained via a system of gullies, and/or drainage channels and pipes, that collect and discharge water to a nearby watercourse, surface water sewer or combined sewer. However, given the age of the infrastructure in Derry/Londonderry, most of the surface water from roads, including within the more historical parts of the city located on the western bank of the River Foyle, is discharged into the combined sewerage network. As a result, instead of surface water being discharged to a water body, it becomes mixed with sewage and other pollutants before arriving at a wastewater treatment works for treatment. This unnecessarily increases the volume of water being treated at wastewater treatment works, impacting capacity, and resulting in additional costs.

3.4 PRIVATE DRAINAGE SYSTEMS

Some of the drainage infrastructure in Derry/Londonderry is privately owned and not maintained by any public body. Some of this Private Drainage Infrastructure (PDI) carries flows from the public drainage and sewerage networks.

Over time, the condition of all drainage infrastructure deteriorates, and, without maintenance, it will eventually fail, leading to flooding and other types of disruption. The majority of PDI has been in existence for many decades and is therefore likely to be in poor condition.

3.5 SEWERAGE NETWORKS

The sewerage networks in the greater Derry/Londonderry area comprise hundreds of kilometres of sewers and over 60 pumping stations. Pennyburn Wastewater Pumping Station (WwPS) is the largest in the city, transferring a large proportion of wastewater flows from the city to Culmore WwTW. Pennyburn WwPS is currently operating close to its design capacity.

Whilst there has been investment in sewerage networks in the greater Derry/Londonderry area, it has not kept pace with the level of development and growth experienced and projected. In the past, the priority has been to invest in the provision of secure, clean drinking water supplies. This has created a legacy of underinvestment in wastewater and drainage infrastructure with much of the original sewerage system built in the 19th and 20th century remaining in service.

These sewerage networks were designed as combined systems with both sewage and surface water from rainfall flowing through the same pipes; their main purpose was to take this wastewater to the nearest river. Nowadays environmental standards rightly require wastewater to undergo appropriate treatment before being returned safely to the environment. The sewage that previously discharged to the nearest river is now treated at WwTWs.

Separate foul and storm sewers have been a mandatory requirement in new developments for over 30 years. However, a high percentage of our sewers, particularly in our town centres, remain combined, carrying both surface water and sewage within one pipe. This means that rainwater is still often pumped and treated unnecessarily with sewage.

Excessive rainfall can also overload sewerage systems which can result in flooding and pollution; this is why Combined Sewer Overflows (CSOs) have been constructed. CSOs prevent overloading of sewers

by allowing surface water that has been mixed with sewage to rise inside the combined sewer and eventually enter a separate pipe, which discharges directly to a river or coastal water without treatment, as shown in Figure 5. If there was no overflow in place, this sewage would force its way out of the network of pipes to the surface, causing flooding and associated damages to homes and businesses. These overflows should, however, only operate during heavy rainfall when the discharge is diluted with rain water. Where they spill too frequently and cause pollution, these are categorised as unsatisfactory by the NIEA and must be rectified by NI Water.

Key wastewater infrastructure in Derry/Londonderry includes sewerage networks which transfer flows from the east of the city across the Craigavon Bridge, and also through the Strathfoyle siphons, to arrive at Culmore WwTW.

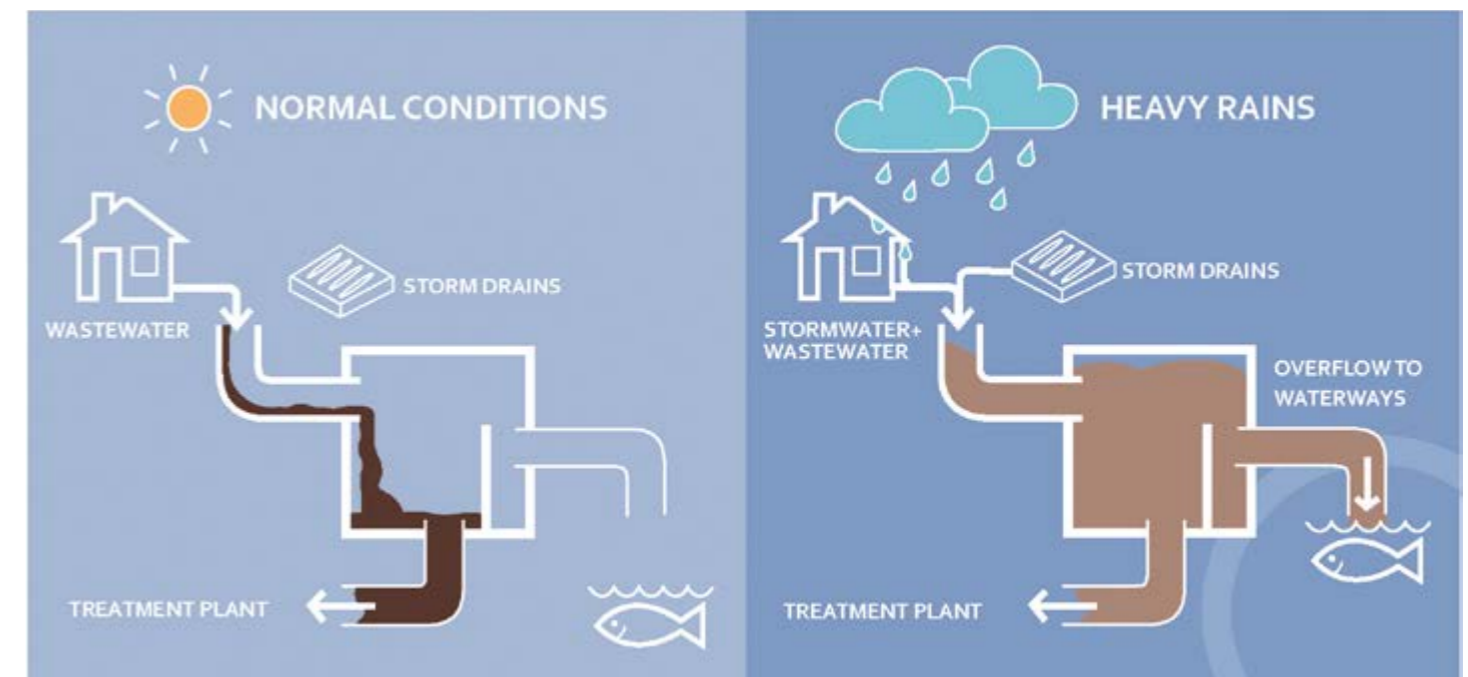


Figure 5 (paragraph 3.5) - Combined Sewer Overflow

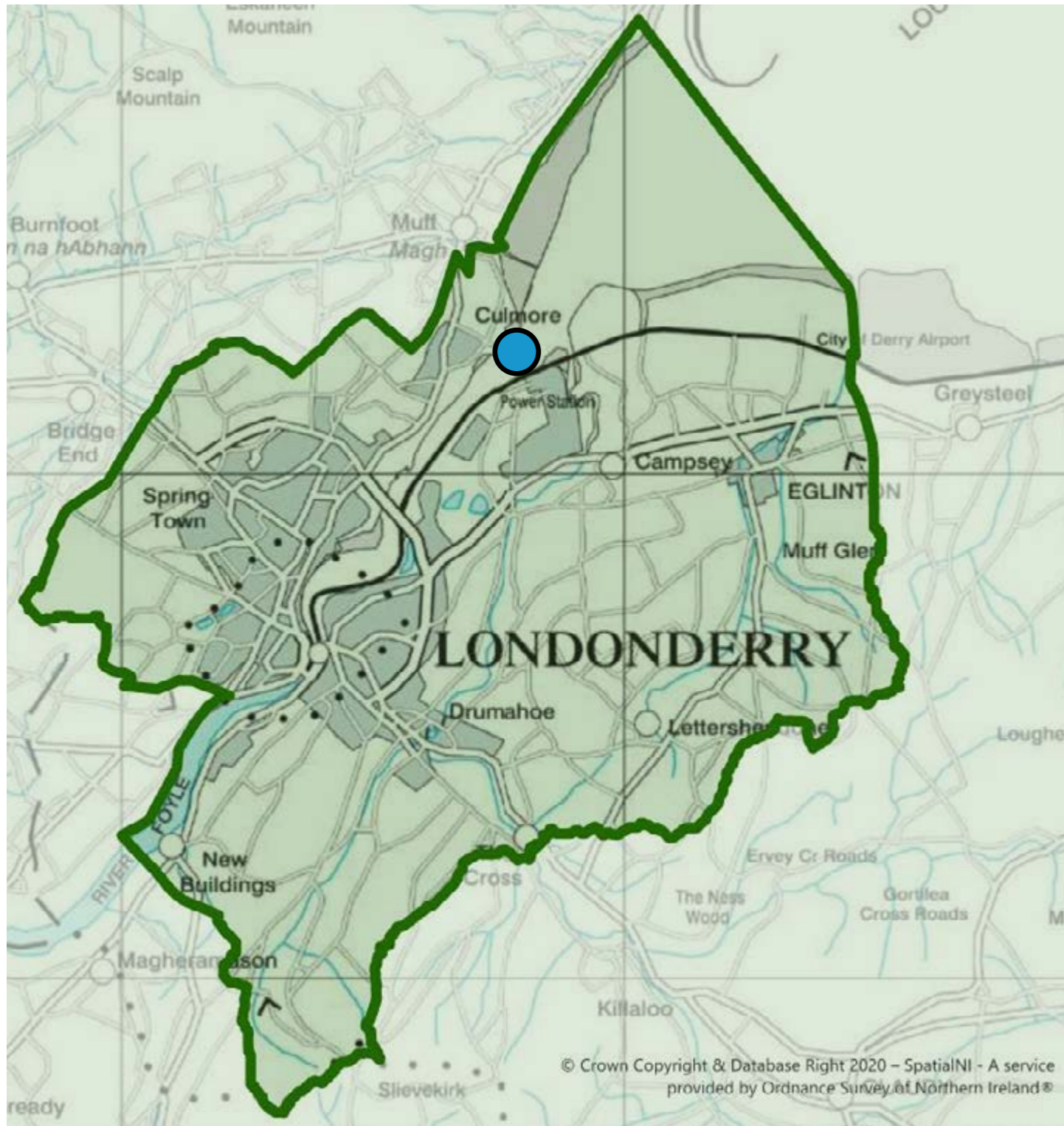


Figure 6 - Derry-Londonderry WWTW

3.6 WASTEWATER TREATMENT WORKS

Most of the wastewater in the greater Derry/Londonderry area is collected and pumped to Culmore WwTW, the largest WwTW in the city, where it is treated before being discharged safely into Lough Foyle. There can be up to six stages in the wastewater treatment process, depending on the environmental standards of the receiving waterbody. Figure 6 shows the location of the Culmore WwTW. There are a further five much smaller WwTWs across the city and surrounding area.

Capacity at Culmore WwTW is currently being exhausted due to increasing development across the city and water infiltration through the ageing sewer network. This impacts the resilience of the treatment works and its ability to cope with unexpected events and could result in pollution to the environment.

A strategic review of the WwTW and associated networks is being undertaken by NI Water, to consider both conveyance and treatment of wastewater.

CHAPTER 04. THE NEED FOR INVESTMENT

4.1 OVERVIEW

Drainage and wastewater infrastructure is central to supporting every aspect of society. However, much of the infrastructure in Derry/Londonderry needs upgraded and requires significant levels of additional investment. Signs that the drainage and wastewater systems are becoming increasingly overwhelmed and failing include more regular instances of flooding; constraints on new residential and business developments; increased sewage spills and pollution; and more frequent sewer collapses and blockages. The frequency and severity of these issues are likely to be exacerbated by the effects of climate change.

Flushing inappropriate items (such as wet wipes, nappies, cotton buds and sanitary products) down toilets and drains can cause blockages in the sewerage system which in turn can cause sewers to overflow into the environment and pollute our rivers. Operational problems also arise from the presence and accumulation of Fats, Oils, and Greases (FOG) in the sewerage system. If poured down kitchen sinks

or drains, FOG can harden and cause blockages known as 'fatbergs', which can lead to flooding and pollution as shown in Figure 7. NI Water spends millions of pounds every year clearing blockages to maintain the operation and capacity of the system and prevent flooding.

Illegal dumping of rubbish or waste, known as 'fly-tipping', also pollutes land and watercourses and can cause flooding issues. It can be dangerous to human and animal health, and removal and associated clean-up is expensive.

4.2 CURRENT DRAINAGE PROBLEMS

Figure 9 illustrates illustrates some of the current drainage problems that exist in Derry/Londonderry. These issues will continue to escalate if we do not invest in our drainage and wastewater infrastructure.



Figure 7 - Rubbish items and a fatberg recovered from sewers



Figure 8 - Set of ladders discovered in a sewer and covered in sewage related debris in Derry/Londonderry

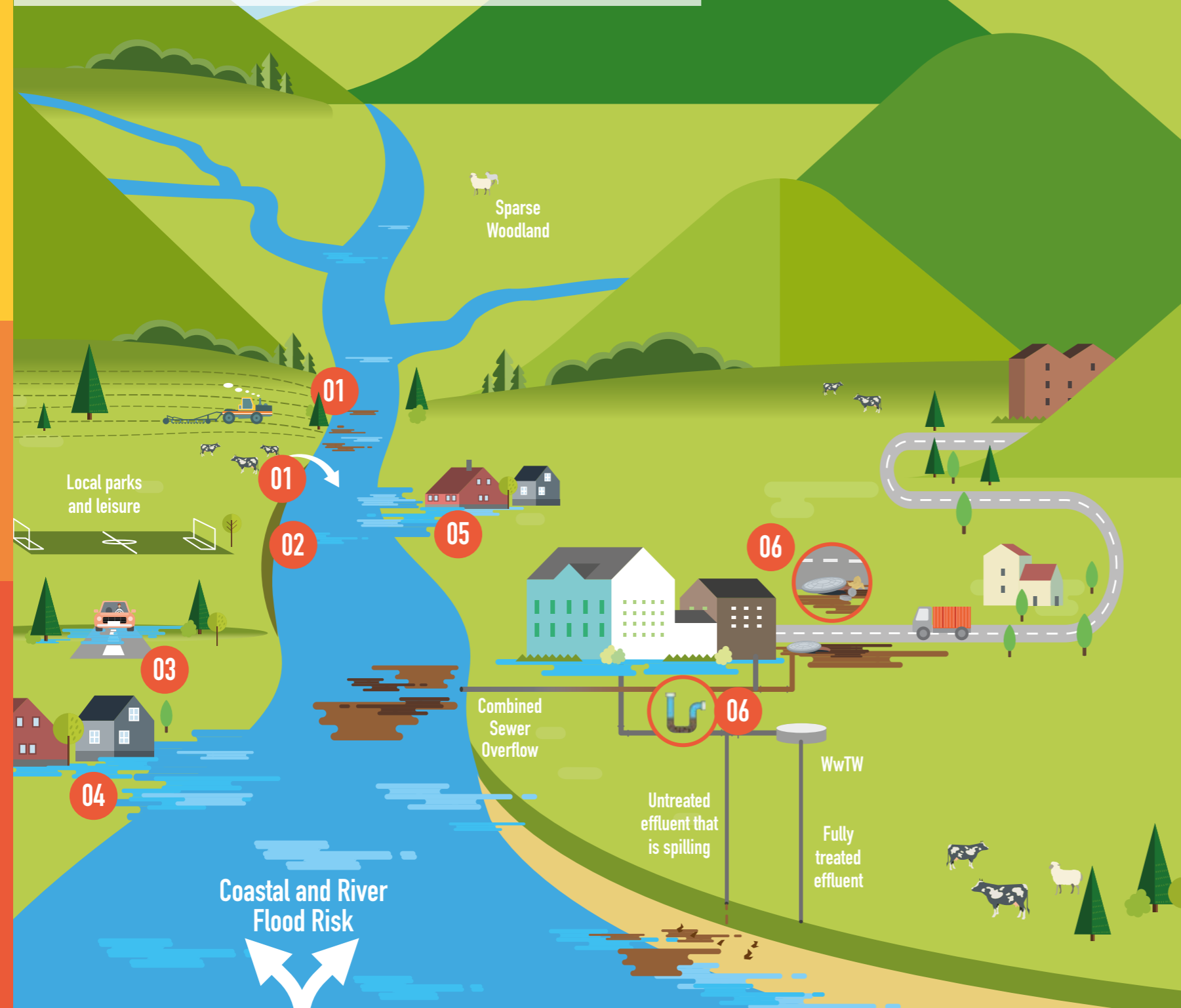
FIGURE 9 CURRENT DRAINAGE PROBLEMS

Without addressing these issues, Derry/Londonderry will continue to be prone to flooding, environmental problems will increase and the future development of Derry/Londonderry could be threatened.

Upper Catchment

Middle Catchment

Lower Catchment



01 Agriculture Run-off / Waste from Livestock

Poor land management practices including over-use of fertilisers and poor management of livestock can cause pollution in our rivers and coastal water.

02 Erosion

Natural erosion along the coastline / riverbank caused by the action of waves or high water flow from a river.

03 Surface Water Flooding

Also known as 'Pluvial' flooding occurs when intense rainfall cannot drain away quickly enough.

04 Coastal Flooding

This occurs during exceptionally high tides or storm surge events.

05 River Flooding

Also known as 'Fluvial' flooding occurs when intense rainfall over a prolonged period causes a river to overflow.

06 Out of Sewer Flooding

This occurs when the sewerage network is overwhelmed by intense rainfall or when a sewer becomes blocked due to inappropriate items being flushed or when the sewer suffers from a structural failure.

CHAPTER 04. THE NEED FOR INVESTMENT

4.3 NEED TO PROTECT AGAINST FLOODING

The effects of flooding on human activity are wide-ranging, with the potential to impact on health, cause pollution, damage buildings and severely compromise economic and social activities. NIFRA (2018) indicates that there are around 25,000 properties at risk of coastal or fluvial flooding across NI from a 1 in 100-year fluvial event or 1 in 200-year coastal event. In addition, approximately 24,500 properties are deemed at risk of surface water flooding from a 1 in 200-year pluvial event. The NIFRA identifies 45 flood risk areas across Northern Ireland, 12 of which have also been identified as APSFR and require a FMRP to be developed. As shown in Figure 12, an area of Derry/Londonderry is identified as an APSFR and it has the second highest level of flood risk amongst the 12 APSFR for Northern Ireland.

DfI has published the *Second Cycle Northern Ireland Flood Risk Management Plan 2021-2027*, developing a shared understanding of flood risk and agreed roles and responsibilities in managing this risk. Greater emphasis was given to surface water flooding due to the predominance of flooding from this source in recent years, and due to the potential damages associated, as indicated in the NIFRA 2018.

Within the last number of years, there have been a number of flood events in Derry/Londonderry of varying severity, including those that occurred in August 2017, and July and November 2022. In some instances, this resulted in significant damage to property and infrastructure, and widespread disruption. Flooding sources vary, including flooding from rivers, from overland flow and from sewers.

It is notable that parts of the city are also susceptible to tidal flooding.

Whilst not all flooding can be prevented, the impact it has can be managed by designing our infrastructure in such a way that when these systems are overwhelmed the excess water can be directed away from people and property. This approach is

known as 'design for exceedance', and it will become increasingly important as flood risk continues to increase due to climate change, urban creep, population growth and lack of capacity in drainage and wastewater infrastructure systems.



Figure 10 - Car in river

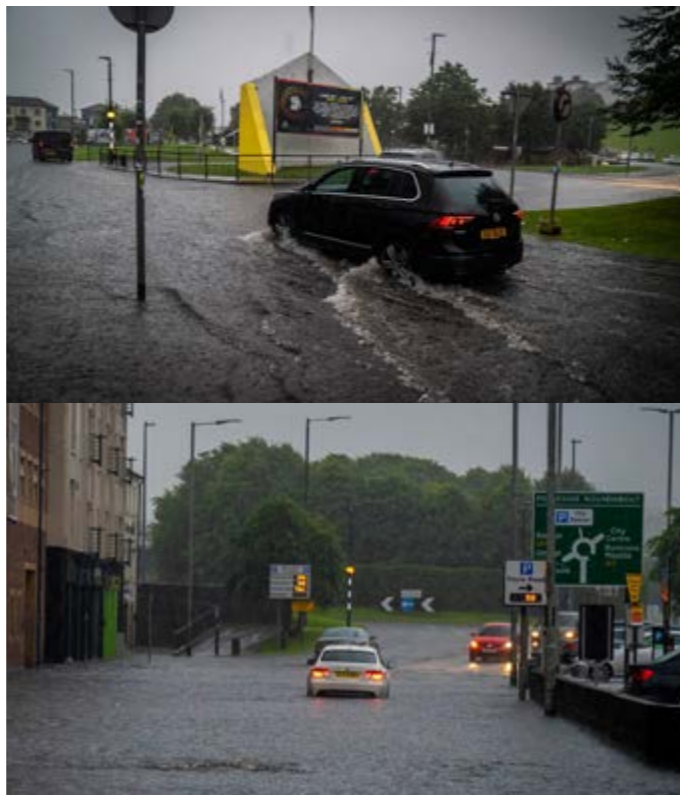


Figure 11 - Flooding Pictures: Aodhán Roberts

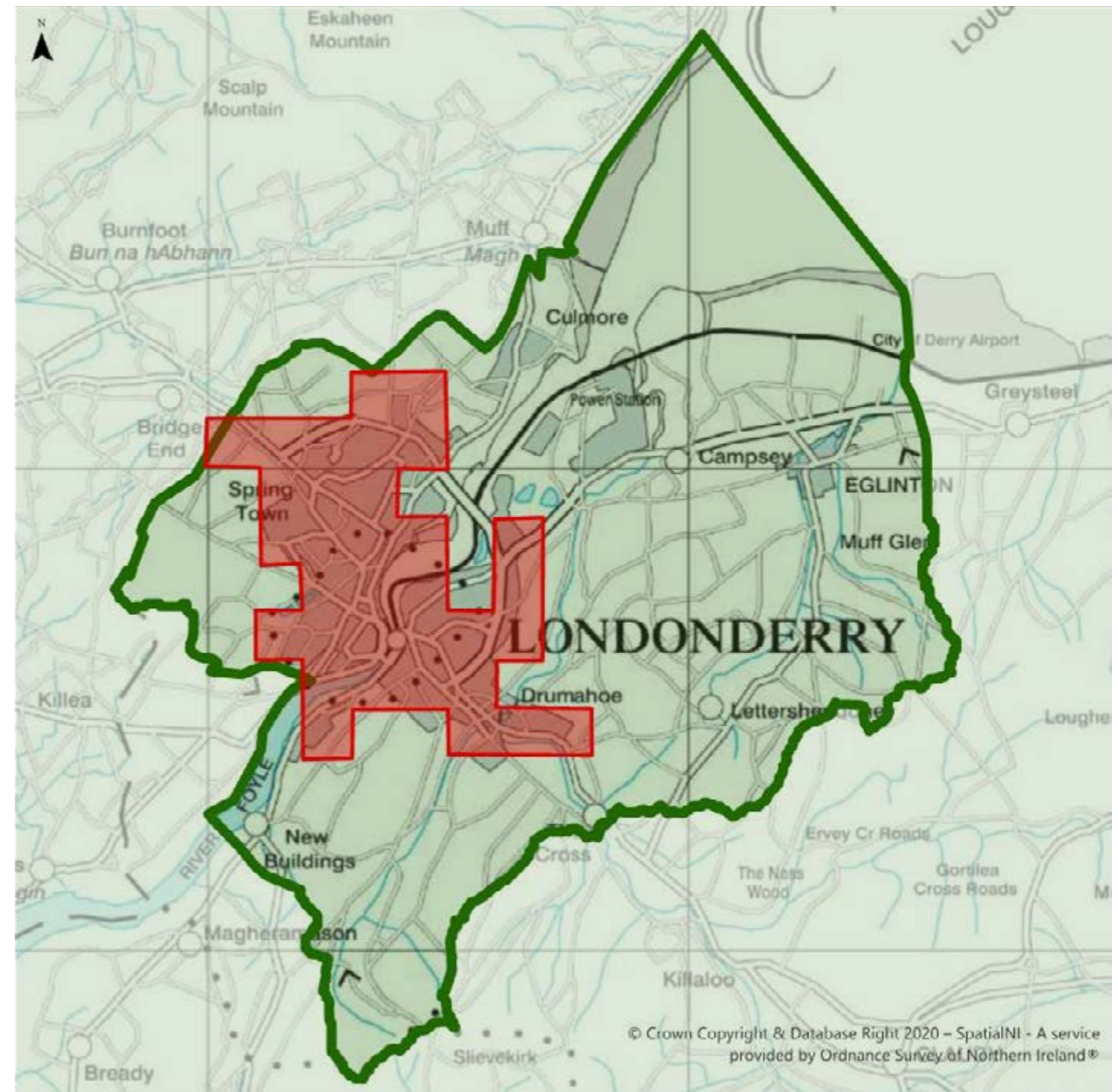


Figure 12 - APSFR within potential SDIP area

■ APSFR BOUNDARY

CHAPTER 04. THE NEED FOR INVESTMENT

4.4 NEED TO ENHANCE THE WATER ENVIRONMENT

Much of the drainage and wastewater infrastructure in Derry/Londonderry is, at times, operating under immense pressure, well above its design capacity.

Funding has not kept pace with the scale of development and growth or with improvements required to support Directives, including the WFD. These pressures are resulting in:

- Constraints on new connections for housing, industry, and businesses.
- Increased instances of out of sewer flooding throughout the catchment with a number of properties already registered as being prone to sewer flooding. Many roads and other key infrastructure also experience external flooding due to capacity constraints or blockages.
- More frequent blockages caused by the collapse of deteriorating sewers, and from increased volumes of wet wipes and other material that should not be flushed. Wet wipes also block overflow screens and combine with FOG to form fatbergs.
- Water quality issues throughout the catchment due to sewer overflows. There are over 90 combined sewer overflows located within the potential study boundary area, and approximately half of these are considered to be operating unsatisfactorily. Not all overflows contain screening, and those that do are often overwhelmed by the type and scale of inappropriate materials now being flushed into the sewers.

Unsatisfactory sewer overflows, continuous discharges from WwTW, and pollution from other sources including agriculture, have resulted in watercourses located within the potential study boundary not meeting WFD targets.

Infiltration through cracks, joints and faulty connections can result in excessive flows entering sewers, which can also overwhelm the drainage infrastructure and result in additional overflows to the water environment.

Further pressures such as drainage infrastructure misconnections (where wastewater drains are connected to surface water drains that are only intended to collect rainwater from roofs, driveways, and roads) result in untreated wastewater, such as from toilets, sinks, washing machines etc. discharging to the local water environment.

Enhancing the water environment through water quality improvements is therefore critical if waterbodies within the study boundary extents are to achieve a minimum of “good ecological status” (or good ecological potential) under the WFD.

4.5 NEED TO FACILITATE ECONOMIC GROWTH

As the principal city of the North West, Derry/Londonderry has received substantial investment in housing, cultural facilities, retail and leisure and there are ambitions for the continued significant growth of the city. Prior to the Covid -19 pandemic, the [2018 Annual Tourism Statistics Report](#) showed that NI tourist numbers had increased from 4 million overnight trips in 2013 to 5 million trips in 2018, resulting in an estimated £968m being spent in the local economy annually.

DCSDC Strategic Growth Plan, published in 2017, sets out its vision for 2032, to create “a thriving, prosperous and sustainable City and District with equality of opportunity for all”.

To achieve this, growth plans for the city and district include an aspiration of 10,000 additional population, and targets to deliver 15,100 additional jobs by 2032. A projected 12,000 additional homes will be needed by 2037 to support this ambition.

This growth is further supported by the [City Deal and Inclusive Future Fund](#) which is the largest ever single investment package by Government into the DCSDC area. This investment will catalyse delivery of a number of projects featured within the [Strategic Growth Plan](#) whilst progressing strategic infrastructure, healthcare, and leisure projects in parallel.

Facilitating this continued growth will require significant levels of investment in drainage and wastewater infrastructure within the Derry/Londonderry area. NI Water has confirmed that, similarly to other parts of Northern Ireland, without investment in drainage and wastewater infrastructure, new planning applications may receive negative responses due to lack of capacity. NI Water has already had to provide negative responses to some planning consultations due to capacity issues in some parts of the network.

Schemes identified as part of NI Water’s Price Control 2021 -2027 investment period will seek to address some of these sewerage and wastewater capacity issues (subject to the adequate funding of the Price Control Final Determinations set by the independent NIAUR). Negative responses to planning application consultations are the last resort for NI Water, and innovative and local solutions will continue to be sought as development comes forward. However, despite these mitigations, there are likely to be instances where planning permission for the development will have to wait for infrastructure investment to be progressed, otherwise the development would be at risk of increasing flooding and/or pollution.

CHAPTER 05. THE LIVING WITH WATER APPROACH

5.1 NEED FOR A NEW APPROACH

As outlined in Chapter 4, much of the drainage and wastewater infrastructure serving the greater Derry/Londonderry area needs urgent upgrade and requires significant levels of additional investment to protect against flooding, enhance the water environment and facilitate economic growth. However, investment alone is not enough; we need to do things differently. The scale of the problem is such that a holistic and coordinated multi-agency response is required to deliver an integrated and catchment-based approach to future drainage and wastewater management.

The challenges of delivering integrated drainage are recognised in [Sustainable Water, A Long-Term Water Strategy](#) which includes a strategic aim to:



Provide Sustainable Integrated
Drainage in Rural and Urban Areas.



This is about taking a holistic approach to rural and urban drainage provision by ensuring that watercourses, culverts, sewers, road drainage and surface water drainage systems are constructed and operated in an integrated manner to address flood risk. To achieve this, stakeholders must work together to develop and deliver outcomes that:

- Are wider than the individual focus of any one participant.
- Address issues in water quality and the risk of flooding at the same time.

Without a sustainable and integrated approach to drainage, rainwater that falls on the land surrounding our urban areas, is often unable to soak into the ground to recharge groundwater or be captured for irrigation or other agricultural uses. This water can flow across the land, into our watercourses and culverts and reach our urban areas very quickly. This, combined with the rainwater that falls on our roofs and hard paving throughout our towns and cities, can result in flash floods that can overwhelm our drainage systems and cause flooding to our homes and businesses.

The volume of water in our drainage systems can also overwhelm our WwTW, resulting in untreated sewage being discharged into local watercourses and coastal waters.

These problems can be alleviated through an integrated and catchment-based approach to future drainage and wastewater management. For the Derry/Londonderry area, we propose a strategic and collaborative approach to investment in drainage and wastewater management through development and delivery of a SDIP. This may include managing rainwater higher up in the catchment through good agricultural and land management practice including the use of Natural Flood Management (NFM) and catchment-based solutions. NFM interventions can control runoff, and reduce agricultural pollution, soil erosion, and peak flows. The provision of flood

storage areas further up the catchment retains water during times of high rainfall, managing downstream flooding. These storage areas help to maintain river flow in times of drought while also providing a range of habitats to improve biodiversity and aid nature recovery.

This catchment-based approach is very much in line with current best practice, including recent guidance by the Construction Industry Research and Information Association on [‘Delivering Better Water Management through the Planning System’](#).

5.2 NEED FOR PARTNERSHIP WORKING

Through analysis carried out as part of the development of the Long-Term Water Strategy, stakeholders identified that significant levels of investment were needed to provide a modern, effective, and efficient drainage and wastewater system to serve towns and cities across Northern Ireland. However, it was recognised that this could not be delivered by one organisation alone and that more effective integrated solutions had to be found.

Although DfI Roads, DfI Rivers and NI Water all have some drainage responsibilities, their focus has traditionally been on preparing investment plans to address their own individual drainage and wastewater management responsibilities. This approach does not always lend itself to solving multiple issues and providing benefits for all.

For example, a significant issue that needs to be addressed is the amount of surface water entering our drainage and wastewater infrastructure. When clean rainwater mixes with sewage, it not only increases wastewater collection and treatment costs, but it also causes increased instances of pollution and flooding due to the infrastructure being overwhelmed. However, as shown in Figure 13, this is a problem that cannot be solved by one organisation in isolation; an integrated and collaborative multi-agency approach is needed.

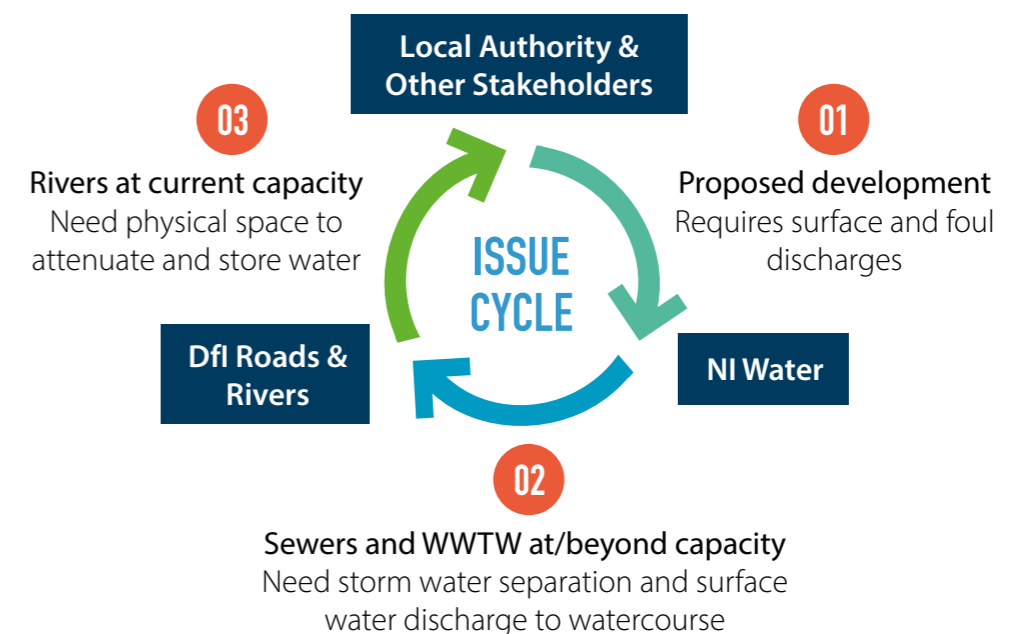


Figure 13 - The Issue Cycle

Sustainable Water
A Long-Term Water Strategy
for Northern Ireland
(2015 – 2040)



CHAPTER 05. THE LIVING WITH WATER APPROACH

5.3 DEVELOPMENT OF THE NEW LWWP APPROACH

Through the LWWP, DfI officials have taken a leading role in developing partnerships with many stakeholders across central and local government and the private sector to develop a new approach for integrated drainage and wastewater management. This work has included examining alternative and innovative approaches that are being implemented in other cities across the UK. Two examples of effective partnership and programme working were identified where stakeholders had successfully worked together to deliver integrated shared drainage and wastewater management solutions. These were the [Metropolitan Glasgow Strategic Drainage Partnership \(MGSDP\)](#) in Scotland, and the [RainScape programme](#) delivered in Llanelli by Welsh Water and Carmarthenshire County Council.

These programmes illustrated the benefits of stakeholders working together, to create catchment-based solutions, where:

- Surface water discharges into combined sewers are reduced or removed through a process known as 'surface water separation'.
- Surface water is managed at source.
- Drainage works undertaken in urban areas include a focus on improving amenity and biodiversity (for example daylighting a culverted watercourse to reduce the risk of flooding may also allow this to become an attractive feature within an urban park).
- Detailed asset surveys and integrated drainage modelling are used to assess the most effective way of conveying water to the sea.
- Detailed water quality sampling and integrated environmental modelling are used to determine the extent of increased storm storage and wastewater treatment.

- Construction works are coordinated to address all types of flooding and the aims of the LWWP holistically whilst minimising disruption.

The LWWP approach was initially developed for Belfast, and a SDIP, entitled '[Living With Water in Belfast: An Integrated Plan for Drainage and Wastewater Management in Greater Belfast](#)' was produced and published in 2021. The process developed as part of the LWWP approach now acts as a blueprint for implementing integrated drainage and wastewater management in other parts of Northern Ireland and will be applied to Living With Water in Derry/Londonderry.

5.4 NEED FOR CATCHMENT-BASED SOLUTIONS

Drainage and wastewater solutions implemented in the past have tended to be of a conventional nature, such as constructing bigger drainage pipes, concrete storage tanks or building taller flood walls. These 'grey' infrastructure solutions are usually tried and tested and are perceived to have low levels of risk, therefore appearing to be a useful option. However, conventional solutions can require higher whole life costs, which can make them unsustainable in the long term.

Conventional drainage and wastewater solutions are often focused on addressing the local symptoms of a more strategic issue that requires a collaborative catchment-based approach to solve, such as making space for surface water across an entire urban area. Because of this, conventional solutions sometimes do not address the root cause of an issue and can inadvertently cause or exacerbate problems elsewhere in the catchment.

For example, building a conventional flood wall might prevent localised flooding from a river. However, there may be a residual risk from surface water flooding created when the increased river levels during a storm prevent the surface water

CASE STUDY STORING SURFACE WATER IN GREEN SPACES

BELFAST CASTLE LEAKY DAMS

This demonstration project was constructed as part of the Living with Water in Belfast Plan.

The project uses NFM measures, such as 'leaky dams', which are effectively wooden barriers constructed within a watercourse to slow the flow of water during heavy rainfall. This, along with a number of swales, helps to slow the flow of water in the watercourse and drainage system, reducing flood risk in the area.

The scheme combines Sustainable Drainage Systems (SuDS) and NFM systems with a forest trail and a new outdoor classroom for visiting schools to use, learning more about the water cycle, flooding, and the environment.



Figure 14 - Leaky dams constructed at Belfast Castle

drainage systems in the area from being able to discharge into the river. The cause of the problem may actually be the flow of water down the river during the storm event. The catchment-based solution might be able to slow the river flow down by providing flood storage upstream using low impact green spaces.

Catchment-based solutions offer an alternative approach to managing the flow and volume of water. They typically mimic natural processes and manage rainfall on the surface and close to source. These measures, inspired and supported by nature, can help to enhance resilience, support climate adaptation, and align with Net Zero commitments.

It is important to recognise that optimum solutions to pressures and issues could involve construction of conventional 'grey' infrastructure alongside blue-green catchment-based solutions.

CHAPTER 05. THE LIVING WITH WATER APPROACH

CASE STUDY CONNSWATER COMMUNITY GREENWAY

CONNSWATER COMMUNITY GREENWAY

The £40m Connswater Community Greenway and East Belfast Flood Alleviation Scheme developed a new 9km linear park through East Belfast, which connects existing green and open spaces and provides accessible paths for both walking and cycling, combined with improvements to flood protection.

The Greenway follows the paths of the Connswater, Knock and Loop rivers which were all artificially altered at some time in the past. The project restored the rivers back to more natural forms, to include native aquatic planting in order to increase biodiversity, allowing greater public access and improving their general appearance. Debris and rubbish were also removed from riverbanks. These measures aimed to support future improvements in the rivers' ecological status, as required by the WFD

The flood alleviation element of the project, incorporating 4.1km of new reinforced concrete floodwalls and 1.2km of flood embankments, provided improvements to flood protection for approximately 1700 properties.

One of the most visible elements of the Connswater Community Greenway is a series of new pedestrian and cycle bridges which now provide connections between communities,

linking a network of green spaces. The Connswater, Knock and Loop rivers which acted as barriers to public movement in the past are now facilitating sustainable travel and healthier lifestyles, and are reconnecting people and places.

The Connswater Community Greenway and East Belfast Flood Alleviation Scheme, which could have been delivered as separate flood alleviation and community regeneration projects, clearly demonstrates the multiple benefits of collaborative working, such as supporting community cohesion, economic development, improvements in public health, cleaner rivers and greater flood resilience.



Figure 15 - Connswater Community Greenway

5.5 IMPORTANCE OF BLUE/GREEN INFRASTRUCTURE

Green spaces such as parks, sports pitches, golf courses, fields and private gardens have not traditionally been considered to be drainage infrastructure. Yet, when these green spaces are developed and replaced with hard surfaces, the rainwater that was previously absorbed and attenuated becomes surface water runoff, which can cause flooding. Green spaces therefore already play a key role in managing surface water flood risk and should be considered as an integral part of the urban drainage system.

When considered strategically, existing green spaces and blue corridors such as rivers can form an extensive network of blue-green infrastructure that can drain, absorb, and retain water. Blue-green infrastructure offers many more benefits to communities than just drainage by providing new opportunities for walking and cycling, amenity spaces and acting as a catalyst for cultural change in the way we live and travel.

In the context of the climate emergency and global warming, blue-green infrastructure contributes to climate adaptation and mitigation, often containing less embodied and operational carbon than conventional drainage solutions, whilst also providing carbon sequestration benefits. The wider environmental benefits associated with blue-green infrastructure include enhancing biodiversity and ecosystems, whilst increasing resilience.

In October 2022, DfI launched a second £750,000 Living Places and Spaces Fund. The aim of the Fund is to support local communities to create more sustainable and resilient community spaces which not only improve the environment but increase awareness of the benefits of blue green infrastructure.

5.6 THE LWWP DESIGN PRINCIPLES

Building on the experience in other UK cities, the LWWP developed and agreed the following design principles for developing integrated, sustainable catchment-based solutions to meet the long-term drainage and wastewater management needs of Derry/Londonderry.

LWWP Design Principles

1	Manage / address water quality and flooding issues at source.
2	Use SuDS. Manage water on the surface where feasible.
3	Reduce surface water flows into the combined sewerage system.
4	Manage flows through the catchment. Reduce peak river flows downstream where appropriate.
5	Manage existing infrastructure – upgrade and adopt/designate problematic PDI where feasible.
6	Manage existing infrastructure – consider maintenance of drainage assets.
7	Create enhanced blue/green spaces – enhance biodiversity.
8	Provide amenity – consider social, environmental and wider benefits.
9	Create more resilient systems, tackling challenges of climate change and exceedance.
10	Coordinate delivery to minimise disruption and maximise value for money.
11	Establish cost effective solutions.
12	Promote sustainable development and planning policy.

Figure 16 provides examples of the various types of drainage and wastewater management measures that could be developed as part of the LWWP.

FIGURE 16 – EXAMPLES OF CATCHMENT BASED DRAINAGE AND WASTEWATER MANAGEMENT SOLUTIONS

In Chapter 4 we illustrated the problems and poor practices of managing water through a catchment. The diagram below illustrates the LWWP approach to managing water through a catchment and the measures we can take to protect against flooding, improve water quality and our environment and enable the area to expand and develop. Each of the numbers on the schematic map relates to a drainage solution or measure that will contribute positively to our objectives.

Upper Catchment

Middle Catchment

Lower Catchment



01

Upper Catchment Management

Measures could include drain blocking, tree planting etc. to slow the flow of water at the top of the catchment.

02

River / Floodplain Reconnection

Re-connecting our rivers to the natural floodplain and allowing areas to flood to protect properties downstream. Measures could include changing the river line, daylighting of culverted rivers and providing instream attenuation structures.

03

Urban SuDS

Measures could include SuDS Ponds, Wetlands, Swales, Woodland / Cross-field Hedge Planting, retrofit, land management NFM, Detention Basins, Green roofs and Rainwater harvesting.

04

Water Run-off Infiltration

Measures to reduce surface water run-off such as Infiltration systems and pervious pavements. Also measures to prevent run-off from agricultural land such as filter / buffer strips to help improve water quality.

05

Storage

Constructed online storage and offline storage to help manage the flow of water through the catchment, which could include flooding of multi-function areas such as car parks or green spaces.

06

Road Alterations

Measures such as changing the camber or alignment of the road could help improve surface water run-off and help protect properties. Measures could also include raising or lowering kerbs and road levels, drainage separation and design for exceedance.

07

Drainage Network Alterations

Measures could include storm separation, oversized pipes to provide storage (hard SuDS), new sewers, CSO improvements / closures, bigger sewers.

08

Sewage treatment

Upgrade or new WwTW and improvement to WwTW outfalls.

09

Direct Defences

Measures such as flood walls and embankments, tidal barriers, etc. can reduce coastal and river flood risk.

Coastal and River Flood Risk

Cleaner Beaches

CHAPTER 05. THE LIVING WITH WATER APPROACH

5.7 DELIVERING AN INTEGRATED APPROACH TO DRAINAGE INVESTMENT

An integrated approach to drainage investment, where greener integrated solutions coexist with traditional infrastructure approaches requires a step change from the 'business as usual' approach. Development and successful implementation of this approach as part of a fully integrated catchment-based programme should result in the scale and cost of some of the hard engineered solutions being reduced or, in some cases, not required.

Managing drainage and wastewater on a catchment basis requires new ways of working. This step change could mean that the solution to a flooding issue that is the responsibility of one drainage organisation could be solved by holding water back in an area, like a green space, that is the responsibility of an entirely different organisation. As illustrated in the solution cycle in Figure 17, by working collaboratively, the organisations involved in drainage and wastewater management can develop integrated solutions that not only address their own problems but also address issues faced by other stakeholders.

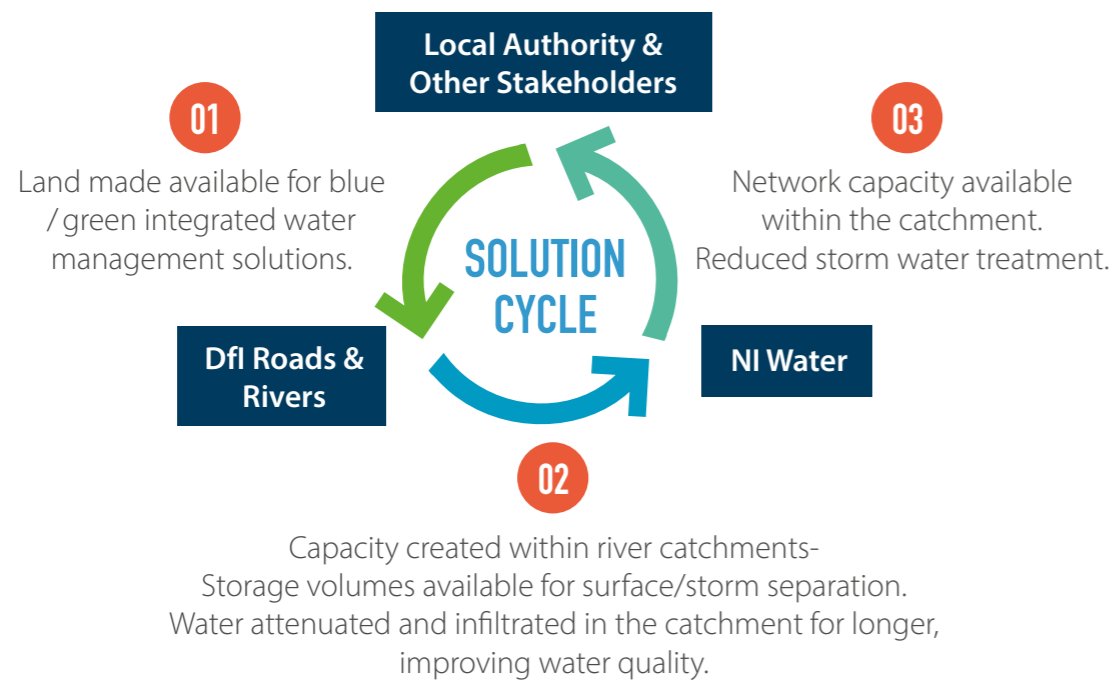


Figure 17 - The Solution Cycle

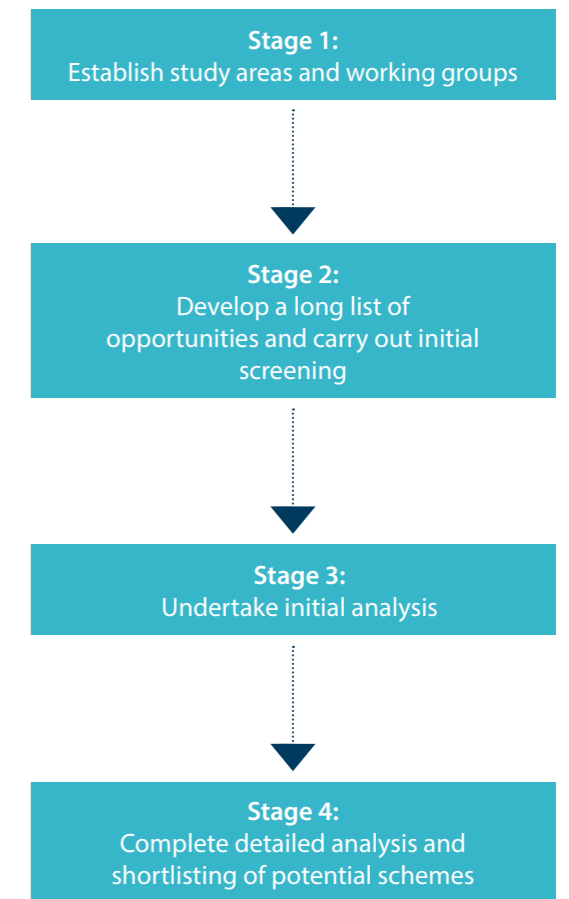
5.8 INTEGRATED DRAINAGE INVESTMENT PLANNING

The Living With Water Programme has developed a new Integrated Drainage Investment Planning (IDIP) process to encourage the main drainage organisations and other stakeholders to work collaboratively. This is intended to develop solutions that seek to resolve drainage and surface water management issues within a catchment in a holistic manner. The IDIP process will inform the development of a SDIP for Derry/Londonderry. The IDIP process is intended to continually evolve and remain live over the life of the SDIP as new partners are identified and new pressures, issues and opportunities emerge.

The IDIP process for Derry/Londonderry is summarised in Figure 18.

Further studies, including surveys, hydraulic modelling and water quality modelling may be undertaken to support the development of the SDIP. Where drivers for detailed analysis exist, this could help to provide a more in-depth understanding of the various elements of the drainage system and shape the optimum combination of solutions.

Figure 18 - Integrated Drainage Investment Process Stages



CHAPTER 06. NEXT STEPS

6.1 DERRY/LONDONDERRY SDIP DEVELOPMENT

In developing the Vision for Living With Water in Derry/Londonderry, it became clear the scale of the problem is such that it requires a coordinated and integrated, multi-agency approach.

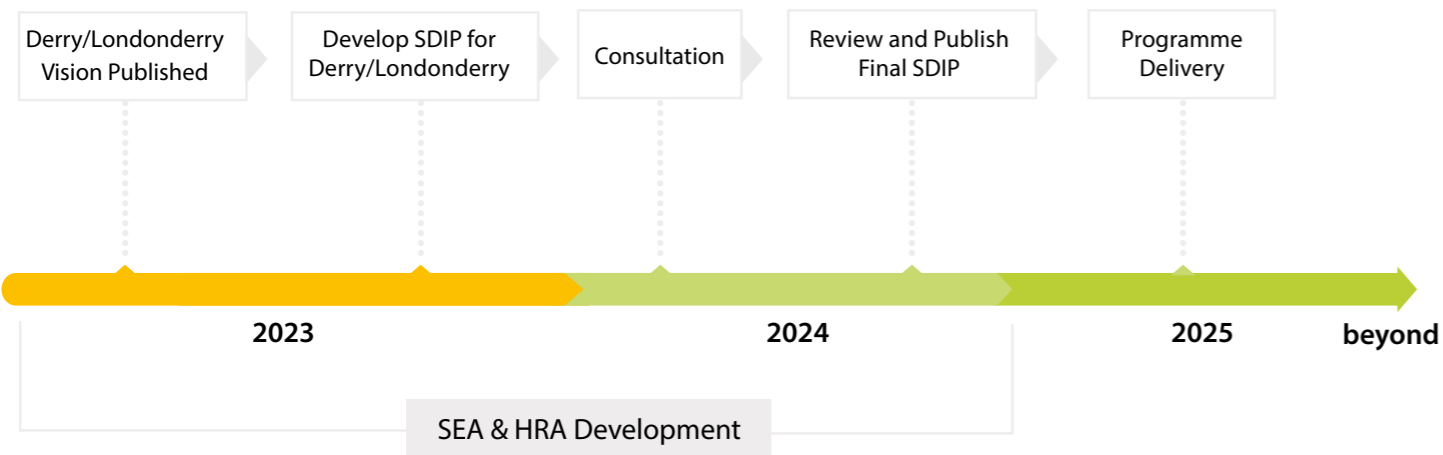
As such, it is considered prudent that a holistic and integrated approach to future drainage and wastewater management is adopted, through the development of a SDIP.

The key outputs of the LWWP are expected to include:

- A SDIP, to identify investment needs to solve drainage and wastewater problems including;
 - the extent of pressures on existing drainage infrastructure in Derry/Londonderry

- potential solutions to address the issues including blue/green solutions
- opportunities for collaboration and integrated investment
- A SEA and HRA completed alongside and informing the development of the SDIP.
- A review of the impact of the proposed SDIP in terms of regulatory and rural needs on equality of opportunity and the potential need for an EQIA.

6.2 TIMELINE



6.3 FURTHER ENGAGEMENT

Any comments on the development of an SDIP for Derry/Londonderry can be sent to LivingWithWater@infrastructure-ni.gov.uk or posted to the address below:

Living With Water in Derry/Londonderry
 Department for Infrastructure
 Room 1.10 Clarence Court
 10-18 Adelaide Street
 Belfast
 BT2 8GB

Hard copies of this document can be obtained, free of charge, by contacting us at the above address or downloaded from the Department for Infrastructure website: <https://www.infrastructure-ni.gov.uk>

The document can also be made available in alternative formats or languages on request.

6.4 WHERE TO FIND FURTHER INFORMATION

If you would like to find out more about the Living With Water Programme, please visit the website: <https://www.infrastructure-ni.gov.uk/articles/lwwwp-background>

GLOSSARY OF TERMS

TERM	DEFINITION
AAAD (Aggregated Annual Average Damages)	The aggregated average economic damages per year that would occur at a defined location from flooding when considered over a very long period of time.
Asset	An asset is a resource with economic value that an individual company or country owns or controls with the expectation that it will provide a future benefit.
Blue-green infrastructure	A strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services.
Catchment	The area of land, including the hills and mountains, woodland, and buildings which water drains from, before flowing into a river, lake, or lough.
Climate change	The rising average temperature of Earth's climate system, called global warming, is driving changes in rainfall patterns, extreme weather, arrival of seasons and more. Collectively, global warming and its effects are known as climate change.
Coastal flooding	Flooding that has come onto land from the sea.
Combined sewers	These pipes carry both wastewater from homes and businesses, and rainwater (also known as storm water), which runs off from roads, drives and roofs (impermeable surface areas), to wastewater treatment works.
Combined sewer overflows	Combined sewer overflows are pipes and pumps which allow excess flows of highly diluted wastewater which, in many cases passes through screens, to remove plastic and rags, to be returned into watercourses/streams and the sea to help prevent homes and businesses from being flooded. Many of these overflows are designed to comply with national standards and any discharges are consented to by the NIEA.
Culverted watercourse	A section of a watercourse that passes below the ground by means of a drain or culvert, where a "culvert" is used to describe any pipe or conduit through which a watercourse passes.
Designated watercourse	A watercourse within Northern Ireland that is designated by the Drainage Council under the Drainage (Northern Ireland) Order 1973. Designated watercourses are maintained (not owned) by DfI Rivers.

TERM	DEFINITION
Drainage infrastructure	A term used to collectively describe all the assets within a drainage system.
Drainage network	A collective term to cover a system of open channels, watercourses or pipes that convey surface water.
Flood Risk Management Plan	A plan that identifies flood hazards/risks and a range of measures to manage flood risk. Preparation of this is a requirement of the Floods Directive.
Fluvial flooding	Sometimes known as 'river flooding'. Flooding that has come onto land from a watercourse.
Foul water sewers	Sewers that carry wastewater from homes and businesses to a wastewater treatment works. In Northern Ireland, most are owned by NI Water.
Habitats Regulations Assessment (HRA)	This refers to the several distinct stages of assessment which must be undertaken, to determine if a plan or project may affect the protected features of a habitats site, before deciding whether to undertake, permit or authorise it.
Hard engineering	Hard engineering refers to construction of physical structures, typically involving concrete.
Integrated Drainage Investment Plan (IDIP)	A plan that sets out how the water quality issues and flooding risks within a selected Study Area will be addressed through changes and investment.
Out of sewer flooding	Flooding caused by water that has come out of a foul or combined sewer.
Pluvial flooding	Sometimes known as 'surface water flooding'. Flooding that occurs when the ground is unable to absorb the rainwater, causing it to flow over the surface and fill depressions and low spots in the landscape where local natural and engineered drainage systems are overwhelmed.
Private drainage infrastructure	A term used to describe drainage pipes that are neither owned by a public body nor a designated watercourse. This could include privately owned sewers, drains and pumping stations.
Receiving waterbody	The body of water that a drainage system ultimately discharges into. This could be a lake, a major river, or the sea.
Resilience	The capacity to withstand or to recover quickly from difficulties.

GLOSSARY OF TERMS

TERM	DEFINITION
River Basin Management Plan	A plan that identified water quality risks and how organisations and stakeholders can work together to deliver a range of measures in order to improve water quality. Preparation of this is a requirement of the Water Framework Directive.
River flooding	Sometimes known as 'fluvial flooding'. Flooding that has come onto land from a watercourse.
Road drain	A pipe used to convey surface water from a road. In Northern Ireland, many are operated and maintained by DfI Roads.
Sewage	The flow in foul and combined water that is produced by a community of people. For example, from toilets, sinks, washing machines, baths and showers. Typically used to describe the contents of foul and combined sewers, which can also be called 'wastewater'. Sewage is one of the main components of wastewater.
Sewage related debris	This is inappropriate materials such as cotton buds, sanitary products, disposable nappies, wet wipes and other items that are flushed down public and private toilets and end up polluting inland and coastal waterways.
Sewerage network	This term is used to describe all of the NI Water sewers, overflows, storm tanks and pumping stations that convey flow to either a WwTW or to a receiving water.
Sewers	These are the pipes that carry surface water or wastewater.
Siphons	A siphon is a tube that allows liquid to travel upward, above the surface of the origin reservoir, then downwards to a lower level without using a pump. When a certain amount of water moves over the bend in the siphon, gravity pulls it down on the longer leg lowers the atmospheric pressure in the bend of the siphon.
Strategic Environmental Assessment (SEA)	A systematic process for evaluating the environmental implications of a proposed policy, plan or programme which provides the means to look at cumulative effects and appropriately address them at the earliest stage of decision making, alongside economic and social considerations.
Sustainable drainage systems	Drainage systems designed to mimic nature and typically manage rainfall close to where it falls.

TERM	DEFINITION
Surface water	This is caused by rainwater that falls on the ground, roofs, roads, pavements, and paths. It can either evaporate back into the air, infiltrate the ground, pond on the surface, or flow into a receiving water (such as a river, lake, or sea) via a wide range of flow paths.
Surface water flooding	Sometimes known as 'pluvial flooding'. Flooding that occurs when the ground is unable to absorb the rainwater, causing it to flow over the surface and fill depressions and low spots in the landscape where local natural and engineered drainage systems are overwhelmed.
Surface water sewers	Sewers that carry rainwater that falls on roads, driveways, and roofs directly to a local watercourse, river, soakaway, or combined sewer. In Northern Ireland, many are owned by NI Water.
Tidal flooding	Sometimes known as 'coastal flooding'. Flooding that occurs when relatively flat areas of land around the shoreline are subject to periodic coverage by the sea.
Unsatisfactory sewer overflow	A combined sewer overflow that does not achieve minimum environmental standards, generally being CSOs that overflow too often or are not screened appropriately. Regulators refer to these as 'Unsatisfactory Intermittent Discharges', with the work 'intermittent' reflecting that the discharge only occurs when it rains.
Wastewater	This is sewage plus other materials such as trade effluent (wastewater from commercial processes) and leachate (polluted water from landfill sites) that could also be discharged into sewers or directly to the WwTW by a tanker.
Wastewater pumping stations	This is a structure to which foul and combined sewers discharge and includes pumps used to pump the sewage to another location, which could be to another sewer, pumping station or to a WwTW.
Wastewater treatment works (WwTW)	WwTW have four main stages of treatment – preliminary, primary, secondary, and tertiary. The number of stages depends on what quality the treated wastewater needs to reach before it can be safely returned back into rivers or the sea.
Watercourse	A channel or passage through which water flows.

