2024

Local Flood Risk Management Strategy & Action Plan

Appendix F – Environmental Assessments

CARDIFF COUNCIL 2024

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Appendix F

Contents

Habitat Regulations Assessment (HRA)

ARUP

City of Cardiff Council

Cardiff Local Flood Risk Management Strategy

Habitats Regulations Assessment Screening and Appropriate Assessment Report

Reference: 30062902-ARP-REP-HRA-3.0

3.0 | 13 September 2024

Job number 300629-02

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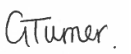
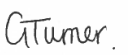
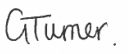
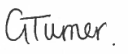
Document Verification

Project title	Cardiff Local Flood Risk Management Strategy and Action Plan
Document title	Habitats Regulations Assessment Screening and Appropriate Assessment Report
Job number	300629
Document ref	30062902-ARP-REP-HRA-3.0
File reference	30062902-ARP-REP-HRA-3.0

Revision	Date				
1.0	15 June 2024	**Filename**	30062902-ARP-REP-HRA-1.0		
		Description	Client issue		
			Prepared by	**Checked by**	**Approved by**
		Name	Matilde Salgado Gemma Turner	Gemma Turner	Neil Harwood
		Signature	 		
2.0	02 July 2024	**Filename**	30062902-ARP-REP-HRA-2.0		
		Description	Final issue		
			Prepared by	**Checked by**	**Approved by**
		Name	Matilde Salgado Gemma Turner	Gemma Turner	Neil Harwood
		Signature	 		
3.0	13 September 2024	**Filename**	30062902-ARP-REP-HRA-3.0		
		Description	Updated to include an appropriate assessment		
			Prepared by	**Checked by**	**Approved by**
		Name	Gemma Turner Amelia Clarke	Gemma Turner Thomas Reid	Fraser Maxwell
		Signature	 	 	

Issue Document Verification with Document ✓

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Executive Summary

A Screening and Appropriate Assessment Report has been prepared by Ove Arup & Partners Limited to support the Cardiff Local Flood Risk Management Strategy and Action Plan, on behalf of the City of Cardiff Council, as the first two stages of a Habitats Regulations Assessment (HRA). Stage 1 of an HRA looks to determine whether there are likely significant effects on any designated sites within the zone of influence of the plan and stage 2 assesses whether there are adverse impacts to integrity of the designated sites. In this instance, four designated sites were scoped in for consideration, as follows:

- Severn Estuary Special Area of Conservation (SAC);
- Severn Estuary Special Protection Area (SPA);
- Severn Estuary Ramsar site; and
- Cardiff Beech Woods SAC.

The screening assessment has concluded that likely significant effects of the plan could not be ruled out, associated with actions Taf4 and Taf5 that propose repairs to the flood defences along the River Taff, and actions Rhy3 and Rhy4 that propose measures to mitigate surface water flooding within the Rhymney River catchment. These actions are screened in to the appropriate assessment due to the potential for construction work to give rise to an adverse effect on site integrity and undermine the conservation objectives for Severn Estuary SAC, SPA and Ramsar site. In the absence of mitigation and/or avoidance measures, there is potential for disturbance and harm to qualifying fish species during the works and measures that could impact fish migration. Furthermore, there is potential for water pollution and the release of invasive species. There are no pathways for impact to Cardiff Beech Woods SAC associated with any elements of the plan and therefore this site was screened out at stage 1.

General best practice measures are identified, with the subsequent appropriate assessment undertaken on the basis that these measures would be incorporated and implemented during the construction works proposed by the plan. The appropriate assessment identified implications for the conservation objectives for the Severn Estuary SAC and Ramsar sites relating to harm and disturbance to fish, associated with the proposed construction activities along the River Taff and within the Rhymney River catchment. Mitigation measures are described to alleviate these risks. This includes conducting all works within functionally linked watercourses (the River Taff and northern brook) between May 15th and October 15th to avoid disturbing spawning salmonids and ensuring construction activities occur during daylight hours to minimize impacts on nocturnal migration patterns of river and sea lamprey. Pollution prevention protocols would be strictly adhered to, with measures such as silt fences, sediment basins, and emergency spill kits in place to prevent contaminants from entering the water. Additionally, any tree clearance would be carefully managed to prevent sediment runoff. With these mitigation strategies, the plan is concluded to be unlikely to adversely impact the integrity of the Severn Estuary designated sites in combination with other plans and projects.

1. Introduction

1.1 Background

Ove Arup & Partners Limited (Arup) has been appointed by City of Cardiff Council to prepare a Habitats Regulations Assessment (HRA) Screening and Appropriate Assessment Report to support the Local Flood Risk Management Strategy and Action Plan (LFRMS) that is currently in development. The draft LFRMS[1] explains how flooding will be managed across the local authority area. This document has been reviewed to identify any likely significant effects on designated sites, either alone or in combination with other plans and projects.

The current strategy updates their first LFRMS that was published in 2014[2]. The original LFRMS included a HRA, which concluded that, in some cases, it was not possible to rule out the possibility of significant effects because the flood strategy did not include all the detail of how actions might be carried out. In these cases, it was considered more appropriate to determine any significant effects at a project level, when more detail about how actions will be carried out is known. Mitigation actions were identified to reduce the potential for projects to have a significant effect on site features. This included ensuring that nature conservation and geomorphological issues are taken into account in the design and construction of new defences, minimising work within the water column and implementing pollution prevention measures.

1.2 Plan Context

The Welsh Government's National Strategy for Flood and Coastal Erosion Risk Management in Wales[3] sets out that over 245,000 properties across Wales are at risk of flooding from rivers, the sea and surface water, with almost 400 properties also at risk from coastal erosion. The National Strategy explains that, as the climate changes, we can expect those risks to increase, with more frequent and severe floods, rising sea levels and faster rates of erosion of the coast. City of Cardiff Council is required, as the Lead Local Flood Authority (LLFA) under the Flood and Water Management Act 2010, to develop and adopt a LFRMS, ensuring the application and monitoring of the strategy throughout its life cycle. Local flood risk includes risks associated with surface water runoff, groundwater and ordinary watercourses.

1.3 Legislation

1.3.1 The Habitats Directive and The Conservation of Habitats and Species Regulations

The requirement for HRA is established by the Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora[4]), which is transposed into UK law by The Conservation of Habitats and Species Regulations 2017[5] (as amended by the EU Exit Regulations 2019) (hereafter referred to as the 'Habitats Regulations').

Article 6 (3) of the Habitats Directive 1992 states 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."

[1] City of Cardiff Council, (2024); "Local flood Risk Management Strategy and Action Plan DRAFT". March 2024

[2] City of Cardiff Council, (2014); 'Local Flood Risk Management Strategy Adopted Strategy - Technical Document. City of Cardiff Council. September 2014.

[3] Welsh Government, (2020); 'The National Strategy for Flood and Coastal Erosion Risk Management in Wales.'

[4] European Commission, (1992); 'Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.' Available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31992L0043:EN:HTML

[5] Her Majesty's Stationary Office (HMSO), (2017); 'The Conservation of Habitats and Species Regulations.'

Regulation 63(1) of the Habitats Regulations states that:

"A competent authority, before deciding to undertake, or give any consent, permission, or other authorisation for, a plan or project which—

(a) is likely to have a significant effect on a designated site or a designated offshore marine site (either alone or in combination with other plans or projects); and

(b) is not directly connected with or necessary to the management of that site,

must make an Appropriate Assessment of the implications for that site in view of that site's conservation objectives."

Regulation 63(5) states:

"In the light of the conclusions of the assessment, and subject to regulation 64, the competent authority may agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the designated site or the designated offshore marine site (as the case may be)."

This report provides City of Cardiff Council, as a competent authority, with sufficient information to undertake an HRA.

Designated sites, or Natura 2000 sites, as defined under the Habitats Regulations, are Special Areas of Conservation (SACs) designated under the Habitats Regulations and Special Protection Areas (SPAs) designated under the Directive 2009/147/EC on the conservation of wild birds (codified version), (Birds Directive), which originally came into force in April 1979. Of relevance to this report, as a matter of UK Government policy, sites designated under the Convention on Wetlands 1971 (the Ramsar Convention)[6] , known as Ramsar Sites, are also included within the consideration of designated sites.

1.4 Process

The HRA process is divided into the following four stages. This HRA report comprises the first and second stages of this process, identifying likely significant effects and mitigation measures and assessing whether the plan has an adverse impact on the integrity of designated sites. Providing that it can be demonstrated that there are no likely significant effects, the plan can proceed, and it would not be necessary to consider stages 3 and 4.

1.4.1 Stage 1 Screening

An assessment of likely significant effects of a plan on designated sites either alone or in-combination with other plans and projects.

1.4.2 Stage 2 Appropriate Assessment

Where it is not possible to rule out likely significant effects during stage 1, it is necessary to undertake an Appropriate Assessment, as set out in Regulation 63 (1) of the Habitats Regulations (refer to section 1.4.1). This considers the implications of a project in view of the designated site's conservation objectives, either alone or in-combination with other plans and projects, taking into account mitigation measures. This provides the competent authority with sufficient information to determine whether the plan has an adverse impact on the integrity of designated sites, which is also referred to as the 'integrity test'.

1.4.3 Stage 3 Alternative Solutions

Where adverse effects on integrity cannot be mitigated, it is necessary to consider alternative solutions to the plan that would not give rise to these effects. The plan may only proceed if it can be robustly demonstrated that there are no alternative solutions, and the assessment can continue to stage 4.

[6] United Nations Educational, Scientific and Cultural Organization (UNESCO), (1994); 'Convention on Wetlands of International Importance especially as Waterfowl Habitat. Ramsar, Iran, 2.2.1971 as amended by the Protocol of 3.12.1982 and the Amendments of 28.5.1987.'

1.4.4 Stage 4 Imperative Reasons of Overriding Public Interest (IROPI) and Compensatory Measures

If no alternatives are identified during stage 3, the plan may only proceed in exceptional circumstances, if pursuit of the option is also justified by IROPI. In this case, compensatory measures must still be put in place to offset adverse effects on integrity.

1.5 Aims

This document fulfils the following objectives:

- Identify elements of the plan that have a potential to result in significant effects on designated sites;
- Assess the implications of these elements of the plan in view of the conservation objectives of designated sites;
- Assess the significance of effects in-combination with other plans and projects where required;
- Consider the implementation of mitigation measures within the plan to offset significant effects; and
- Consider the implications of the plan on the integrity of designated sites.

2. The Plan

The LFRMS describes out how flooding will be managed across Cardiff city, consistent with the objectives, measures and related policies and legislation set out in the National Strategy. The strategy will be reviewed every two years.

The plan defines the responsibilities of the City of Cardiff Council and the scope of the plan in terms of managing local flood risk associated with ordinary watercourses, surface water and groundwater and inputs and associations with other parties, including Natural Resources Wales, which is responsible for managing flood risk from the three main rivers within Cardiff. It reviews the risk of flooding in the area, including how flood risk is assessed. Of relevance to this assessment, it states that the management policy of Cardiff's coastline is set out in the Severn Estuary Shoreline Management Plan 2 (SMP2)[7].

The plan sets out Cardiff's flood risk management objectives, measures and actions that are aligned with the national objectives. The objectives provide overarching targets or outcomes of flood risk management, and the measures define broad activities and ways of working to meet the objectives. There are nine objectives and 26 measures. The actions define specific tasks, activities, or initiatives to meet the measures. Progress is reviewed and actions can be updated on a regular basis, reporting on progress every two years. There are 36 actions in total, comprising: 21 city-wide actions; two actions relating to the River Ely; four for the Rhymney River; a further eight for the River Taff; and one for Flatholme Island. The plan also sets out funding mechanisms, specifically internal funding within the City of Cardiff Council, Welsh Government funding and external funding opportunities.

3. Methodology

The HRA has been carried out in line with Guidance on the use of Habitats Regulations Assessment[8] and the Habitats Regulations Assessment Handbook[9] and, with specific reference to the assessment of plans, the

[7] Atkins Ltd for the Severn Estuary Coastal Group (SECG), (2010); 'Severn Estuary Shoreline Management Plan Review (SMP2).'

[8] GOV.UK, (2019); 'Appropriate assessment. Guidance on the use of Habitats Regulations Assessment.' Available at: https://www.gov.uk/guidance/appropriate-assessment.

[9] Tyldesley, D. and Chapman C., (2017); 'The Habitats Regulations Assessment Handbook.' DTA Publications. Available (with login details) at https://www.dtapublications.co.uk/handbook/

Department for Communities and Local Government (DCLG) publication, 'Planning for the Protection of Designated Sites: Appropriate Assessment guidelines'[10].

It follows the following approach:

1. Evidence gathering;
2. Task 1 - Likely significant effects or 'screening', identifying whether the project is likely to have a significant effect on designated sites; and
3. Task 2 – Appropriate Assessment and ascertaining the effect on site integrity.

3.1 Evidence Gathering

All designated sites within the Cardiff City local authority boundary are considered in the HRA, in addition to those within the influence of the plan in terms of possible significant effects through a known impact pathway. The following sources were reviewed to obtain information on designated sites:

- Natura 2000 Standard Data Forms and Ramsar Information Sheets were obtained from the Joint Nature Conservation Committee (JNCC) website[11]; and
- Citations, conservation objectives[12,13,14,15], supplementary advice on conserving and restoring site features and Site Improvement Plans for designated sites and condition assessments for component Sites of Special Scientific Interest (SSSIs) were sourced from the Natural England's website[16] and Natural Resources Wales website[17].

3.1.1 Biological Records

Records of fish species found in the River Taff were requested from Natural Resources Wales. Records only included species anticipated presence and lacked specific locations, timestamps and population numbers. The National Biodiversity Network (NBN) atlas[18], Centre for Environment, Fisheries and Aquaculture Science (CEFAS)[19] website and DataMapWales[20] were also checked for fish records for the River Taff and the Rhymney River.

[10] DCLG, (2006); 'Planning for the Protection of European Sites: Appropriate Assessment. Guidance For Regional Spatial Strategies and Local Development Documents.'

[11] JNCC, (2016); 'UK Protected Sites.' Available at: http://jncc.defra.gov.uk/page-4.

[12] Natural England, Countryside Council for Wales and Welsh Assembly Government, (2009); 'The Severn Estuary / Môr Hafren European Marine Site comprising : The Severn Estuary / Môr Hafren Special Area of Conservation (SAC) The Severn Estuary Special Protection Area (SPA) The Severn Estuary / Môr Hafren Ramsar Site. Natural England & the Countryside Council for Wales' advice given under Regulation 33(2)(a) of the Conservation (Natural Habitats, &c.) Regulations 1994, as amended.'

[13] Natural England, (2019); 'European Site Conservation Objectives for Severn Estuary Special Protection Area Site Code: UK9015022.'

[14] Natural England, (2019); 'European Site Conservation Objectives for Severn Estuary/Môr Hafren Special Area of Conservation Site code: UK0013030.'

[15] Countryside Council for Wales, (2008); 'Core Management Plan (including Conservation Objectives) for Cardiff Beech Woods Special Area of Conservation (SAC) (underpinned by Garth Woods SSSI, Castell Coch Woodlands and Road Section SSSI, and Fforestganol a Chwm Nofydd SSSI).'

[16] GOV.UK, (no date); 'Planning and Development Protected Sites and Species.' Available at https://www.gov.uk/topic/planning-development/protected-sites-species.

[17] Natural Resources Wales, (no date); Protected areas of land and seas. Available at: https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity/protected-areas-of-land-and-seas/?lang=en

[18] NBN Atlas Partnership, (2024); 'NBN atlas.' Available at: https://nbnatlas.org/.

[19] CEFAS, (2024); 'Data and Publications.' Available at: https://www.cefas.co.uk/data-and-publications/.

[20] DataMapWales, (2024); 'Data catalogue.' Available at: https://datamap.gov.wales/

3.2 Task 1: Screening for Likely Significant Effects

This assessment considers whether there are any likely significant effects of the plan on designated sites, either alone or in combination with other plans and projects.

Every element of the plan has been analysed and screened for likely significant effects and its potential to undermine the conservation objectives for a given designated site. Effects of the plan have been identified through a review of the plan in light of the sensitivities of the designated sites, particularly the qualifying features, pressures and threats.

In line with current guidelines[9], it has been assumed that best practice guidelines would be implemented as part of projects proposed by the plan, including a Construction Environmental Management Plan (CEMP) or similar. This would include the implementation of pollution prevention construction measures and control of invasive species. These are measures are considered in the assessment as they are not related to mitigation specifically aimed at alleviating impacts to the designated sites. Any such, bespoke mitigation that would be required to mitigate significant effects are not considered at this stage, and instead form part of an appropriate assessment.

The screening stage is a preliminary examination. If significant effects cannot be ruled out without extensive investigation, the project is considered to have a likely significant effect and requires further investigation through an appropriate assessment.

3.2.1 Screening Criteria

The plan has been screened in accordance with the criteria set out in Table 1[9].

Table 1 Screening Criteria

Screening Category	Criteria	Screening Outcome
A	General statement of policy / general aspiration	Screened out
B	Policy listing general criteria for testing the acceptability / sustainability of proposals	Screened out
C	Proposal referred to but not proposed by the plan	Screened out
D	Environmental protection / site safeguarding / threshold policies	Screened out
E	Policies or proposals which steer change in such a way as to protect designated sites from adverse effects	Screened out
F	Policy that cannot lead to development or other change	Screened out
G	Policy or proposal that could not have any conceivable effect on a site	Screened out
H	Policy or proposal the (actual or theoretical) effects of which cannot undermine the conservation objectives (either alone or in combination with other aspects of this or other plans or projects)	Screened out
I	Policy or proposal which may have a likely significant effect on a site alone	Screened in
J	Policy or proposal with an effect on a site but unlikely to be significant alone, so need to check for likely significant effects in combination	Check categories K and L
K	Policy or proposal unlikely to have a significant effect either alone or in combination	Screened out after the in-combination test
L	Policy or proposal which might be likely to have a significant effect in combination	Screened in after the in-combination test
M	Bespoke area, site of case-specific policies or proposals intended to avoid or reduce harmful effects on a designated site	Screened in

If the pre-screening schedule indicates that there are aspects of the plan that might be likely to have significant effects on a designated site, either alone or in combination with other plans and projects,

consultation with the City of Cardiff Council was undertaken to identify changes to the plan to avoid any such effects. Any changes incorporated into the plan have then been considered and the screening assessment repeated as required prior to finalisation of the report and conclusion on the screening decision. These changes to wording in the plan would relate to essential features or characteristics of the plan itself and are therefore not likely to amount to the introduction of mitigation measures. Should mitigation measures be required to avoid or reduce those harmful effects, it will be concluded that there are likely significant effects, and an appropriate assessment will be required.

3.2.2 In-combination Assessment

The in-combination assessment has focused on whether any other plans and projects have the potential to exacerbate any effects to designated sites that are identified due to the plan alone. Therefore, consideration has been given to whether effects of the plan that are not likely to be significant alone, could be significant in combination, as per categories J, K and L in Table 1.

The following types of plans and projects were considered in the in-combination assessment:

- Applications lodged but not yet determined, including refusals subject to an outstanding appeal or legal challenge;
- Projects subject to periodic review e.g. annual licences, during the time that their renewal is under consideration;
- Projects authorised but not yet started;
- Projects started but not yet completed;
- Known projects that do not require external authorisation;
- Proposals in adopted plans; and
- Proposals in draft plans formally published or submitted for final consultation or adoption.

3.3 Task 2 - Appropriate Assessment

The purpose of the appropriate assessment is to undertake an objective scientific assessment of the implications for the Severn Estuary designated sites' qualifying features potentially affected by the plan in light of their conservation objectives. It is a transparent and iterative process, which is fully documented in this report. It provides the information necessary for the City of Cardiff Council to assess whether the plan has an adverse effect on the integrity of designated sites, which is referred to as the 'integrity test'.

Where significant effects have been identified during screening or the significance of effects are uncertain, further consideration has been given to the potential for these effects to be of a sufficient scale and magnitude to hinder the features of the designated sites from meeting their conservation objectives. This stage in the process also takes account of mitigation measures.

3.3.1 Assessment of Effects in Relation to Conservation Objectives

The assessment of effects on the Severn Estuary designated sites in relation to their conservation objectives has considered the following factors:

- The implications for each qualifying feature of the designated sites affected;
- The conservation status of the qualifying features of the sites;
- Implications for the site conditions for the Severn Estuary SPA and SAC; and
- Threats, degradations or disturbance of the qualifying features.

3.3.2 Mitigation Measures

Consideration has been given to the inclusion of mitigation measures to avoid significant effects or lessen effects to the extent that they do not constitute adverse effects to integrity. This comprises bespoke measures that would need to be implemented during construction works proposed by the plan. These are high level

measures that would need to be developed in due course as part of a separate project HRA. As a last resort, the assessment may consider changes to the plan, including changes to the actions or the removal or addition of actions.

Effects of the plan are reassessed following the implementation of mitigation measures using the same methodology. This process may be repeated several times to provide confidence in an assessment of no adverse effects.

3.3.3 Integrity Test

The report considers whether an adverse effect on the integrity of designated sites can be ruled out; the 'integrity test'. Integrity is described as:

"The site's coherence, ecological structure and function across its whole area that enables it to sustain the habitat, complex of habitats and/or the levels of populations of species for which it was classified."[21]

Integrity also relates to a site's resilience and ability to evolve in ways that are favourable to conservation.

3.3.4 The Use of Professional Judgement

Professional judgement has been used in the interpretation of results in relation to assessment of effects, the significance of effects and consequences for the conservation objectives of designated sites. A precautionary assessment has been applied in line with current guidance, whereby an effect is deemed significant if the effect cannot be ruled out on the basis of objective information.

3.3.5 In-combination Assessment

The in-combination assessment was repeated as part of the Appropriate Assessment to consider whether there are adverse impacts to integrity in combination with other plans and projects. Relevant plans and projects were identified in accordance with the criteria set out in section 3.2.2.

4. Baseline Conditions

The following designated sites have been considered in this HRA as they are located within Cardiff City local authority boundary:

- Severn Estuary SAC;
- Severn Estuary SPA;
- Severn Estuary Ramsar site; and
- Cardiff Beech Woods SAC.

There are not considered to be other designated sites within the influence of the plan in terms of possible significant effects through a known impact pathway.

Full details concerning site areas, qualifying features, conservation objectives, condition assessments and pressures/threats are provided in Appendix A and summarised in the following sections. Figure 1 provides a map showing the locations of these designated sites in relation to Cardiff City.

[21] Office for the Deputy Prime Minister (ODPM), (2009); 'Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System.'

Figure 1 Designated Sites within the Zone of Influence of the Plan

4.1 Severn Estuary

The Severn Estuary lies on the southwest coast of Britain at the mouth of four major rivers (the Severn, Wye, Usk, and Avon). It is a large estuary with extensive intertidal mudflats and sandflats, rocky platforms and islands. The estuary's classic funnel shape, unique in Britain, is a factor causing the Severn to have the second-largest tidal range in the world. Consequently, the intertidal zone is one of the largest and most important in Britain. Salt marsh fringes the coast backed by ditches and occasional brackish ditches. The seabed is rock and gravel with subtidal sandbanks. It is designated as an SAC, SPA and Ramsar site, with qualifying features defined below.

4.1.1 Special Area of Conservation

The Severn Estuary has been designated as an SAC on the basis that it supports occurrences of habitat types and species listed in Annexes I and II respectively of the Habitats Directive that are considered important in a designated context. The SAC contains the following component SSSIs:

- Upper Severn Estuary;
- Severn Estuary; and
- Bridgwater Bay.

Annex I habitats that are the primary reason for selection of this site:

- Estuaries;
- Mudflats and sandbanks not covered by sea water at low tide; and
- Atlantic salt meadows *Glauco-Puccinellietalia maritimae*.

Annex I habitats present as a qualifying feature, but not primary reason for selection of this site:

- Sandbanks which are slightly covered by sea water at all times; and
- Reefs.

Annex II species that are the primary reason for selection of this site:

- Sea lamprey *Petromyzon marinus*;
- River lamprey *Lampetra fluviatilis*; and
- Twaite shad *Alosa fallax*.

In addition to the aforementioned species, the assemblage of migratory fish (including allis shad *Alosa alosa*, Atlantic salmon *Salmo salar*, sea trout *Salmo trutta* and European eel *Anguilla anguilla)* are part of the ‘notable species sub-feature’ of SAC estuary feature.

4.1.2 Special Protection Area

The site supports internationally important bird populations over winter, including both resident and migratory species. It contains the following SSSIs:

- Bridgwater Bay;
- Flat Holm;
- Severn Estuary;
- Steep Holm;
- Sully Island;
- Upper Severn Estuary; and
- Penarth Coast.

The site qualifies under Article 4.1 of the Birds Directive by regularly supporting internationally important wintering populations of the following species listed in Annex I:

- Bewick swan *Cygnus columbianus bewickii* 3.9% of the wintering population in Great Britain (1991/2 - 1995/6 5-year peak mean).

The site qualifies under Article 4.2 by supporting populations of international importance of the following migratory species:

- Gadwall *Anas strepera* 0.9% of the wintering population in North-western Europe (1991/2 -1995/6 5-year peak mean);
- Greater white-fronted goose *Anser albifons albifons* 0.4% of the wintering population in North-western Siberia and Northern Europe (1991/2 -1995/6 5-year peak mean)
- Dunlin *Calidris aplina alpina* 3.3% of the wintering population from Northern Siberia, Europe and Western Africa (1991/2 -1995/6 5-year peak mean);
- Common redshank *Tringa totanus* 1.3% of the wintering population in the Eastern Atlantic (1991/2 - 1995/6 5-year peak mean), and
- Common shelduck *Tadorna tadorna* 1.1% of the wintering population in North-western Europe (1991/2 -1995/6 5-year peak mean).

Over winter the area regularly supports an internationally important assemblage of birds in excess of 20,000 waterfowl: 84317 waterfowl (5 year peak mean 1991/92-1995/96) including: Bewick swan, common shelduck, gadwall, dunlin, and common redshank.

4.1.3 Ramsar site

The site qualifies for Ramsar criterion 1, 3, 4, 5, 6 and 8, as outlined below.

- Criterion 1 - Sites containing representative, rare or unique natural and near-natural wetland types with the biogeographic region: Due to immense tidal range (second largest in world), this affects both the physical environment and biological communities.
- Criterion 3 - Sites supporting populations of plants and/or animals important for maintaining the biological diversity of the biogeographic region: Due to unusual estuarine communities, reduced diversity and high productivity.
- Criterion 4 - Sites supporting plant or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions: This site is important for the run of migratory fish between the sea/estuaries and freshwater rivers. Species include Atlantic salmon, sea trout, sea lamprey, river lamprey, allis shad, twaite shad and European eel. It is also of particular importance for migratory birds during spring and autumn.
- Criterion 5 - Sites regularly supporting 20,000 or more waterbirds. Sites regularly supporting in excess of 20,000 waterfowl: 70,919 waterfowl (5 year peak mean 1998/9 – 2002/2003).
- Criterion 6 - Sites regularly supporting 1% of the individuals in a population of one species or subspecies of waterfowl:
  - Bewick's Swan – 2.8% of the winter population in Great Britain (5 year peak mean 1998/9 – 2002/2003);
  - White-fronted goose – 35.8% of the winter population in Great Britain (5 year peak mean 1998/9 – 2002/2003);
  - Shelduck – 1% of the winter population (5 year peak mean 1998/9 – 2002/2003);
  - Gadwall – 1.4% of the winter population in Great Britain (5 year peak mean 1998/9 – 2002/2003);
  - Dunlin – 1.8% of the winter population (5 year peak mean 1998/9 – 2002/2003); and

  - Redshank – 1% of the winter population (5 year peak mean 1998/9 – 2002/2003).

- Criterion 8 - Sites containing an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks depend: The fish of the whole estuarine and river system is one of the most diverse in Britain, with over 110 species recorded. Atlantic salmon, sea trout, sea lamprey, river lamprey, allis shad, twaite shad and European eel use the estuary as a key migration route to their spawning grounds in the many tributaries of the Severn. The site is also an important feeding and nursery ground for many fish species, particularly allis and twaite shad which feed on mysid shrimps within the salt wedge.

4.2 Cardiff Beech Woods Special Area of Conservation

Cardiff Beech Woods SAC represents an area of semi-natural broadleaved woodland dominated by beech. The SAC is underpinned by three component SSSIs:

- Garth Wood;
- Fforestganol a Chwm Nofydd; and
- Castell Coch Woodlands and Road Section.

Annex I habitats that are the primary reason for the designation of this site:

- *Asperulo-Fagetum* beech forest.

Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:

- *Tilio-acerion* forest of slopes, screes and ravines.

Cardiff Beech Woods contains one of the largest concentrations of *Asperulo-Fagetum* beech forests in Wales and represent the habitat close to the western limit of its past native range in both the UK and Europe. The woods show mosaics and transitions to other types, including more acidic beech woodland and oak *Quercus* and ash *Fraxinus excelsior* woodland. Characteristic and notable species in the ground flora include ramsons *Allium ursinum*, sanicle *Sanicula europaea*, bird's-nest orchid *Neottia nidus-avis* and yellow bird's-nest *Monotropa hypopitys*.

5. HRA Screening Assessment

The plan is not directly connected with or necessary to the management of the designated site(s) potentially affected and is therefore not exempt from the requirements of HRA.

5.1 Pathways for Effect

Implementation of the plan as summarised in Section 2 could lead to a range of effects on the Severn Estuary designated sites that have been scoped into the assessment, as summarised in Table 2. This table also details the range of impact types that are considered with respect to each effect. Consideration has been given to pathways along which development can be connected with designated sites, rather than arbitrary boundaries or distances from designated sites. There are no pathways for effects on Cardiff Beech Woods SAC considering the locations and nature of the development proposed by the plan.

Table 2 Summary of Potential Effects

Effects on designated Sites	Impact Types
Habitat loss, fragmentation and degradation	Restrictions to fish passage within functionally linked habitats Habitat loss within functionally linked habitats Release of and/or spread of invasive species
Disturbance and harm	Disturbance and harm to migrating fish
Changes to hydrological regime/water levels	Changes to surface water flow pathways Changes in hydraulic conditions
Changes to water quality	Water pollution from water emissions and spills Disturbance to contaminated soils and sediment Sediment run off

5.1.1 Habitat Loss, Fragmentation and Degradation

There are no potential effects relating to direct land take within any of the designated sites. However, there is potential for development within catchments that are considered functionally linked for qualifying features of the Severn Estuary to result in habitat loss and fragmentation. Many tributaries of the River Severn provide, or have the potential to provide, functionally linked habitat for the designated migratory fish assemblage of the estuary. The habitats in these rivers, including spawning and nursery areas, are essential for the fulfilment of the species' lifecycle.

There are potential effects relating to the introduction and/or spread of invasive species within watercourses that are hydrologically connected to the Severn Estuary, resulting in competition and habitat degradation in functionally linked habitats for the Severn Estuary designated sites.

5.1.2 Disturbance and Harm

There is potential for works within watercourses that are functionally linked to the Severn Estuary to cause disturbance and harm to qualifying fish species site associated with the Severn Estuary SAC and Ramsar site. These effects could relate to underwater noise and vibration associated with plant and the movement of machinery in the water/riparian zone and disturbance to the river substrates and banks. In the absence of mitigation, there is also a risk harm and mortality to fish as a result of dewatering activities, either through asphyxiation in dewatered areas or through entrained into temporary pumps.

In addition to aquatic habitats, there are areas of functionally linked land outside the boundary of the designated site that provide key feeding areas and roosting habitat for bird species particularly at high tide, including freshwater coastal grazing marsh, neutral grassland, improved grassland and open standing water. There is not considered to be potential for significant effects to qualifying bird species associated with the implementation of the plan, considering the urban context of the proposed works and disturbance from roads and other development.

5.1.3 Changes to Hydrological Regime/Water Levels

The plan proposes actions to manage surface water to reduce flood risk and damage to properties. Changes to surface water pathways and human induced changes in hydraulic conditions could have effects on the Severn Estuary designated sites through changes in water levels. Changes are likely to be negligible within the designated sites, but may give rise to more material changes within functionally linked watercourses.

5.1.4 Changes to Water Quality

There is potential for implementation of the plan to cause water pollution within the Severn Estuary catchments associated with surface water management and repairs to flood defences, which could result in far reaching adverse effects on the SAC, SPA and Ramsar site. This includes contamination of the water and sediments and harm to fragile ecosystems, including qualifying habitats, birds and fish.

5.2 Effects of the Plan Alone

Table 3 identifies the elements of the plan that have been screened into the Appropriate Assessment due to the potential for significant effects alone, in line with the criteria set out in Table 1.

Full screening, including all parts of the plan that have been screened out and the rationale, is provided in Appendix B.

Table 3 Screened in Elements of the Plan with Likely Significant Effects Alone

Element of the Plan	Assessment	Conclusion
Chapter 8: Flood Action Rhy3	Category I – Developing a Full Business Case (FBC) (detailed design) for Greener Rumney could lead to development as assessed under Rhy4.	Screened in
Chapter 8: Flood Action Rhy4	Category I – The Outline Business Case (OBC)[22] identifies the study area as a mature residential suburb within the Rhymney River catchment approximately 1.15km north of the Severn Estuary SPA, Ramsar and SAC. The proposals involve measures to mitigate surface water flooding to manage peak water flows within the catchment. The preferred option 2 involves: the creation of a wetland in the playing fields; widening of the northern brook; the construction of swales and ponds; a new surface water pipe network; and rain gardens. Many of these features would incorporate diverse planting to provide an ecological enhancement. It is understood that there are no works proposed within or alongside the Rhymney River itself. The Rhymney River catchment is hydrologically connected to the tidal section of the Rhymney River, which flows into the Severn Estuary designated sites. Therefore, there is a pathway for the proposed works associated with the FBC to impact these designated sites.	Screened in
Chapter 8: Flood Action Taf4	Category I - Preparation of the Radyr Court Road Business Justification Case (BJC) could lead to development as assessed under action Taf5.	Screened in
Chapter 8: Flood Action Taf5	Category I - Radyr Court Road construction involves repairs to failing flood defences along the River Taff to prevent flooding, which could have implications for the Severn Estuary designated sites. The proposed works are located approximately 7.29km northwest of these sites. There are no published details available for these works beyond a site plan. These are to be developed following preparation of the BJC. However, it is understood that the gabion baskets along the river are failing, meaning that it is likely that works will be required within and along the banks of the river, involving a cofferdam to reduce the width of the water and enable access to the toe of the flood defences within the river (City of Cardiff Council, personal communication). It is assumed that the cofferdam would span approximately 2-3 metres (m) into the river channel and that this will involve the removal of debris and vegetation within the site and dewatering the area behind the cofferdam with pumps. There would also be a requirement to remove trees along the banks. The River Taff flows into the Severn Estuary and is hydrologically connected to the Severn Estuary designated sites and therefore there is a pathway for the proposed works to impact these sites.	Screened in

5.2.1 Severn Estuary Special Area of Conservation

A review of fish records was undertaken to assess whether the River Taff and Rhymney River provide habitat for qualifying fish species (sea lamprey, river lamprey and twaite shad), as well as species that form part of the migratory fish assemblage for the Severn Estuary SAC and therefore whether there could be effects on this site associated with fragmentation, harm and disturbance.

The River Taff is impounded by Cardiff Bay Barrage, which incorporates a specially designed fish pass to allow fish including Atlantic salmon, sea trout and European eel to return to the rivers Taff and Ely[23]. These species have been recorded along the River Taff (Appendix C) and the Rhymney River. Atlantic salmon and sea trout spawn in the upper reaches of the River Taff in winter, the young fish migrate downstream and out

[22] Arup, (2021); 'Rumney South Outline Business Case FCERM Outline Business Case Report.'

[23] Cardiff Harbour Authority, (no date); 'Barrage Story.' Available at: https://www.cardiffharbour.com/barrage-story/#1616431096437-81313e35-f2c2

to sea via the Severn Estuary. The adults return to their spawning grounds to complete their life cycle. These species are part of the migratory fish assemblage that qualifies under the SAC designated site. European eel spawn in the Sargasso Sea, but typically live most of their life in freshwater.

In Britain, spawning populations of twaite shad are found in the rivers Severn, Wye, Usk and Tywi and appear to be reasonably stable[24]. There are no records for this species along the River Taff on the list provided by NRW (Appendix C) or on the NBN atlas[18] and only a single record for twaite shad in freshwater within the 10km grid square including Cardiff in 1972. No records of the twaite shad are listed on NBN atlas or on DataMapWales for the Rhymney River. This species is therefore assumed to be absent from the River Taff and Rymney River catchment.

Both sea and river lamprey have been recorded along the River Taff (Appendix C). There are also records of lamprey (Petromyzontidae) in the Rhymney River. These species migrate from estuaries up rivers to spawning grounds during the winter and spring[25]. They spawn in areas of small stones and gravel in flowing water in rivers, the larvae drift downstream and burrow in silt beds. They mature in the silt beds and then 'transform' and migrate to estuaries, including the Severn Estuary. Sea and river lamprey are therefore assumed to be present in the River Taff and Rhymney River; both adults migrating to spawning grounds but also larval (ammocoetes) lamprey that live in silt beds for many years. Sea trout, Atlantic salmon and European eel are migratory species that are also assumed to be present. As such, likely significant effects on the Severn Estuary SAC cannot be ruled out, associated with harm and disturbance during the works. The width of the River Taff where the works are proposed is approximately 40m. On the basis that the cofferdam would be approximately 2-3m wide, it is assumed that there would be no restrictions to fish migration during the works along the River Taff and therefore no likely significant effects relating to habitat fragmentation. There are also no likely significant effects associated with habitat fragmentation relating to the scope of works described within the Rhymney River catchment. However, there is potential for impacts to spawning grounds for river and sea lamprey, sea trout and Atlantic salmon within the Rhymney River catchment and River Taff, associated with widening of the northern brook and repairs to flood defences within the River Taff.

There is potential for habitat degradation relating to the release or spread of invasive species and changes to water quality associated with water pollution, sediment run off and disturbance to contaminated soils and sediment during construction. Water pollution and invasive species are listed as threats to the SAC.

5.2.2 Severn Estuary Special Protection Area

Water pollution and invasive species are also listed as threats to the SPA considering the potential for indirect effects on qualifying bird species associated with impacts to their habitats. As such, likely significant effects on the SPA associated with changes to water quality and habitat degradation cannot be ruled out.

5.2.3 Severn Estuary Ramsar

Atlantic salmon, sea and river lamprey, sea trout and European eel are part of the migratory fish assemblage that qualifies under criterion 4 of the Severn Estuary Ramsar site. Likely significant effects therefore cannot be ruled out, associated with habitat loss, harm and disturbance to qualifying fish during the works, as described above in section 5.2.1 relating to the SAC.

There is also potential for habitat degradation relating to the release or spread of invasive species and changes to water quality associated with water pollution, sediment run off and disturbance to contaminated soils and sediment during construction. Likely indirect significant effects due to the potential for water pollution and the release or spread of invasive species cannot be ruled out.

5.3 Effects of the Plan In-combination

The assessment has identified actions that could be significant alone, but there are no elements of the plan that are not significant alone that could be significant in-combination with other plans and projects (Table 1,

[24] Maitland, P. S. and Hatton-Ellis, T. W., (2003); 'Ecology of the Allis and Twaite Shad.' Conserving Natura 2000 Rivers Ecology Series No. 3. English Nature, Peterborough.

[25] Maitland P. S., (2003); 'Ecology of the River, Brook and Sea Lamprey.' Conserving Natura 2000 Rivers Ecology Series No. 5.

categories J, K and L). As such, an in-combination assessment is not required as part of the screening assessment. As there are likely significant effects alone, mitigation measures are required as part of the appropriate assessment (refer to Sections 6.2 and 6.3.3) and an in-combination assessment in conjunction with other plans and projects is provided in Section 6.3.5, with reference to Appendix D.

5.4 Summary

The screening assessment identified that likely significant effects on the Severn Estuary SAC, SPA and Ramsar site resulting from the plan could not be ruled out and as such an appropriate assessment (Stage 2 of the HRA process, see Section 6) was required. A detailed review and assessment are required to develop a mitigation strategy to mitigate for habitat loss and degradation, disturbance and harm and changes to water quality and thus avoid adverse impacts to the integrity of the designated sites. This will consider the timing of works relating to fish passage and the methodology including the implementation of pollution prevention measures.

Error! Reference source not found. summarises the results of the screening assessment in accordance with the following categories:

- Likely significant effects have been identified or the significance of effects are uncertain and therefore an Appropriate Assessment is required (indicated by a tick ✓); and
- No likely significant effect and therefore an appropriate assessment is not required (indicated by a cross ✗).

Table 4 Summary of Screening Results

Designated Site	Likely Significant Effects		
	Habitat Loss and Degradation	Disturbance and Harm	Changes to Water Quality
Severn Estuary SPA	✓	✗	✓
Severn Estuary SAC	✓	✓	✓
Severn Estuary Ramsar	✓	✓	✓
Cardiff Beech Woods SAC	✗	✗	✗

6. Appropriate Assessment

6.1 Scope

The appropriate assessment reviews the actions in Table 3 that were screened in and provides recommendations for plan level mitigation for likely significant effects on designated sites, as summarised in Table 4.

With respect to each designated site, the appropriate assessment provides an assessment of the effects of the plan in relation to the conservation objectives, outlines any further mitigation measures, and then concludes on whether the plan is considered to have an adverse impact on the integrity of designated sites.

6.2 General Site Best Practice Measures

There is a risk that construction activities along the River Taff and within the Rhymney River catchment that are proposed by the plan under actions Rhy3, Rhy4, Taf4 and Taf5 may inadvertently lead to dust, pollution events, sediment run-off, disturbance to contaminated soils and sediment and the release/spread of invasive species resulting in indirect impacts to the Severn Estuary SAC, SPA and Ramsar site as these rivers are hydrologically and functionally linked to these designated sites. These risks would be avoided or reduced through the application of standard best-practice pollution prevention techniques and methods to be outlined in a CEMP.

The CEMP would include measures such as those contained within the Environment Agency's Guidance for Pollution Prevention 5 (PPG5)[26] and Pollution Prevention Guidelines 6 (PPG6)[27]. All measures detailed in the agreed CEMP would be adhered to by contractors working on site. All construction activities would be carried out in accordance with guidance outlined within Construction Industry Research and Information Association (CIRIA) best practice guidance[28].

The CEMP would contain the following best practice methods to mitigate the risk of pollution (as relevant):

- The storage and use of hazardous chemicals would be in accordance with the Control of Substances Hazardous to Health Regulations (2002) (as amended);
- Environmentally friendly products would be used where possible;
- All waste materials would be disposed of in designated skips/areas;
- Emergency spill kits are to be maintained at every work location or be easily accessible at all times from a centralised location;
- Equipment to be stored on designated drip trays/bunded areas;
- All refuelling operations are to be undertaken at the site compound, at least 10m from any watercourse;
- Refuelling operations must always be manned, never left alone, or the fuel trigger jammed open;
- Hoses and valves to be checked regularly for signs of wear and renew as and when required;
- If a spill should occur, the following protocol should be used: stop, contain and notify;
- Bulk cement and other fine powder materials are to be delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery;
- For smaller supplies of fine power, materials bags are to be sealed after use and stored appropriately to prevent dust;
- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use;
- Vehicles entering and leaving sites are to be covered to prevent escape of materials during transport;
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable);
- Any excavations and excavated material will be kept damp, where possible, to control dust generation;
- Ground investigations and consultation with Geoscience should identify the risk of any contaminated land within the study area prior to works. Any required measures should be implemented to prevent contamination from entering watercourses;
- All vehicles and machinery will be switched off when not in use, and properly maintained; and
- All traffic on site will be restricted to low speeds to minimise emissions.

The following measures would be implemented to control the spread or release of invasive species, which would also be incorporated within the CEMP as appropriate:

- Strict biosecurity measures would be included to cover workers, plant and equipment working in/or near watercourses, that adhere to the check-clean-dry protocol;
- Pre-construction surveys would be undertaken of all areas within the construction footprint to identify the location of any invasive species;

[26] Environment Agency, (2015); 'Works in, near or over watercourses, PPG5: prevent pollution.' Available at: https://www.gov.uk/government/publications/works-in-near-or-over-watercourses-ppg5-prevent-pollution.

[27] Environment Agency, (2016); 'Construction and demolition sites, PPG6: prevent pollution.' Available at: https://www.gov.uk/government/publications/construction-and-demolition-sites-ppg6-prevent-pollution.

[28] CIRIA, (no date); 'CIRIA guidance', Available at: https://www.ciria.org/ci/Civil_infrastructure/CIRIA_guidance.aspx

- Details of invasive species shall be included within the project induction and toolbox talks given to operatives (including the identification of sites where Himalayan balsam *Impatiens glandulifera*, signal crayfish *Pacifastacus leniusculus* and other invasive non-native species have been recorded in physical survey and eDNA monitoring). Any early regrowth shall be reported and dealt with as per the methodology detailed below and within an Invasive Species Management Plan;
- No water will be transferred between catchments, to prevent the accidental transfer of either signal crayfish or crayfish plague;
- Assurance should be sought from external contractors that, where possible, machinery is not being brought onto site immediately from works on external waterbodies. Machinery should be dry and free of mud or debris from all previous sites; and
- Vehicles used to transport soils must be thoroughly inspected and appropriately cleaned in a designated area before being used for other work. The designated cleaning area must be within an area of hard standing or covered by a root barrier membrane that can contain and collect the material washed off. The cleaning area must be located so as not to allow material to contaminate drains, ditches or watercourses.

6.3 Severn Estuary Designated Sites

6.3.1 Conservation Objectives

The conservation objectives are summarised below for reference in the assessment, with full details provided in Appendix A.

Ensure that the integrity of the Severn Estuary SPA and SAC are maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:

1. The extent and distribution of qualifying natural habitats and habitats of qualifying species
2. The structure and function (including typical species) of qualifying natural habitats
3. The structure and function of the habitats of qualifying species
4. The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely
5. The populations of qualifying species, and,
6. The distribution of qualifying species within the site.

There are further detailed conservation objectives for the Severn Estuary SAC[12] which are summarised below.

The estuaries, subtidal sandbanks, mudflats and sandflats, Atlantic salt meadows and reefs should be maintained in favourable condition by ensuring:

7. Total extent and distribution are maintained;
8. Physical form and dynamic processes are maintained;
9. Communities' extent, variety, and composition are maintained;
10. Supporting sediment sizes and budgets are maintained;
11. Structural variation (e.g., salt marsh sward) is maintained;
12. Estuarine processes and characteristic morphology are maintained;
13. Water column characteristics support ecological objectives;
14. Toxic contaminants in water and sediment are below harmful levels;
15. Airbourne contaminants are below harmful levels; and

16. Habitats can develop naturally (e.g., *Spartina anglica* salt marsh).

River lamprey, sea lamprey and twaite shad should be maintained in favourable condition by ensuring:

17. Unobstructed migratory passage;
18. Sustainable population sizes in the long term;
19. Abundance of prey species is maintained; and
20. Toxic contaminants in water and sediment are below harmful levels.

There are further detailed conservation objectives for the Severn Estuary SPA[12] which are summarised below:

21. Bewick's Swan: Maintain a 5-year peak mean population size of at least 289 individuals;
22. European White-Fronted Goose: Maintain a 5-year peak mean population size of at least 3,002 individuals;
23. Dunlin: Maintain a 5-year peak mean population size of at least 41,683 individuals;
24. Redshank: Maintain a 5-year peak mean population size of at least 2,013 individuals;
25. Shelduck: Maintain a 5-year peak mean population size of at least 2,892 individuals;
26. Gadwall: Maintain a 5-year peak mean population size of at least 330 individuals;
27. Waterfowl Assemblage: Maintain a 5-year peak mean population size of at least 68,026 individuals;
28. Maintain unrestricted bird sightlines (≥200m for most species, >500m for Bewick's swan);
29. Ensure habitat conditions are suitable for species' feeding, roosting, and refuge needs; and
30. Prevent significant disturbances to species aggregations at critical sites.

The conservation objectives for the Severn Estuary Ramsar site refer to the equivalent conservation objectives for the SPA and SAC (refer to Appendix A), with details also added relating to the assemblage of migratory fish species:

31. Maintain the feature in favourable condition, as defined by the conservation objective for the SAC "estuaries feature".
32. Maintain the assemblage of migratory fish species in favourable condition by ensuring:
    a. Unobstructured migratory passage for adult and juvenile migratory fish through the Severn Estuary;
    b. Population sizes of assemblages of migratory fish in the Severn Estuary and its rivers are maintained at sustainable levels;
    c. Abundance of prey species for the migratory fish assemblage is maintained; and
    d. Toxic contaminants in the water column and sediment are below levels that would pose a risk to the ecological objectives posted above.
33. Maintain the Bewick's swan, European white-fronted goose, dunlin, redshank, shelduck, gadwall and internationally important assemblage of waterfowl features in favourable condition, as defined by the conservation objectives for the SPA features; and
34. Maintain the internationally important assemblage of waterfowl in favourable condition, as defined by the conservation objective for the SPA feature.

6.3.2 Assessment of Effects

The following sections assess the effects of the implementation of the plan in relation to the conservation objectives for the Severn Estuary SAC and Ramsar site. There are no implications for the conservation

objectives for the Severn Estuary SPA given the implementation of best practice measures described in section 6.2. These measures mitigate for potential indirect effects on the qualifying bird species for the SPA relating the release or spread of invasive species and water pollution.

6.3.2.1 Habitat Loss and Degradation

Likely significant effects resulting from the release or spread of invasive species causing habitat degradation would be mitigated through the best practice measures outlined in section 6.2 and therefore there are no implications for the conservation objectives for the Severn Estuary designated sites.

Actions Rhy4, Rhy5, Taf4 and Taf5 have the potential to impact spawning grounds used by qualifying fish species, associated with widening of the northern brook within the Rhymney catchment and repairs to flood defences within the River Taff. These activities could impact gravel beds used by lamprey, sea trout and Atlantic salmon for spawning. The proposed works are limited in extent and only within functionally linked habitats; no habitat loss is anticipated directly within the designated sites. Any effects on spawning grounds would be temporary, given that the habitats would be reinstated or enhanced following the works, particularly considering the aquatic and riparian habitat enhancements proposed within the Rhymney catchment that would benefit fish species, including diverse native planting. No permanent habitat loss is anticipated and therefore there are no long-term effects. It is therefore considered that potential habitat loss would not limit the Severn Estuary SAC and Ramsar site from meeting its conservation objectives.

6.3.2.2 Disturbance and Harm

There is potential for the works proposed under actions Rhy4, Rhy5, Taf4 and Taf5 to cause disturbance and harm to river and sea lamprey and other migratory species that qualify under the SAC designation and under criterion 4 of the Ramsar site (including sea trout, Atlantic salmon and European eel). The proposed cofferdam and dewatering within the River Taff constitutes the biggest risk in terms of disturbance and harm to wildlife. Fish can be killed by being trapped in pumps or left stranded without water on the riverbed floor if not removed from the water before installation. Moreover, the installation of the cofferdam is assumed to involve silt removal, which are used by the ammocoete (larval) stages of lamprey species. Widening of the northern brook could also cause harm and disturbance, including disturbance within potential spawning grounds. Disturbance could also result from underwater noise and vibration during construction within the River Taff and northern brook. Such effects could have implications for the Severn Estuary SAC and Ramsar site achieving conservation objectives 5, 6, 18 and 32b and therefore give rise to adverse effects to the integrity of those sites.

6.3.2.3 Changes to Water Quality

Disturbance during cofferdam installation and removal and works to the banks including tree removal could increase sedimentation within the water column. If pre-dredging and levelling is required for cofferdam installation, then this could also lead to increased sedimentation and turbidity within the water column. Disturbance through the widening of the northern brook has the potential to increase the sediment load and turbidity in the water which could also reduce the water quality. These works could reduce water quality within functionally linked habitats and to a lesser extent within the Severn Estuary SAC and Ramsar site. The effects would only occur during construction and therefore would be temporary, with the magnitude of effect being dependent upon the timing of the works and indirect effects upon qualifying species. Changes to water quality associated with sedimentation could limit the ability of the Severn Estuary SAC and Ramsar site in meeting conservation objectives 2, 3 and 10. It is assumed that the best practice measures outlined in section 6.3.3 would be implemented to mitigate other impacts relating to water pollution.

6.3.3 Mitigation Measures

The following mitigation measures are required to avoid or reduce effects on the Severn Estuary designated sites. These measures need to be incorporated into project HRAs and implemented during construction:

- Works within the River Taff and Rhymney catchment will take place between 15th May and 15th October to avoid disturbing spawning salmonids, their spawning grounds, and juveniles before they become mobile. Physical disturbance (e.g. from temporary over-pumping) will be minimised through best practice construction techniques (e.g. fish translocation, pollution control measures).

- Where instream works or dewatering are required, they will be carried out under the supervision of a suitably qualified Ecological Clerk of Works (ECoW) with a freshwater ecology and fisheries specialism and experience of overseeing construction activities in or near water. The ECoW role will involve overseeing the dewatering process and fish translocation to move fish from impacted areas. This would involve managing the drawdown rate, based on the abundance of fish, through liaison with the fish translocation team. Fish translocation would take place prior to dewatering to move fish from impacted areas to suitable habitat elsewhere. Netting and/or electric fishing techniques would be used, under a Salmon and Freshwater Fisheries Act (SaFFA) Section 27A exemption enabling the use of fishing instruments (other than rod and line) and/or removal of fish from inland waters, obtained from Natural Resources Wales.
- River lamprey and sea lamprey migration occurs at nighttime and therefore the works will not directly impact upon this as they will be during daylight hours. However, if it is essential to undertake works at night or weekends for the purposes of safety and cannot be avoided, it will be necessary to liaise with Natural Resources Wales and other relevant stakeholders to agree timing of works and relevant mitigation if required.
- Tree and shrub clearance will be minimised and efforts are to be made to ensure that no sediment including silt, soils, mud, clay and sand enters the river. This includes implementing silt fences and sediment basins, combined with re-vegetation of exposed soil areas, to capture and filter sediment.
- A Sediment Management Plan will be produced to specify appropriate controls. This may include details of additional temporary cut-off ditches to manage sediment runoff and as a worst-case precaution the use of 'siltbuster' water processing devices.
- Areas of exposed sediment deemed at risk of erosion during heavy rainfall or flood inundation should be protected using either temporary measures (e.g. sheeting) or semi-permanent measures (for example coir matting) until vegetation is able to establish.
- Construction platforms will be located in the floodplain. These will be required to be kept as low as possible in the floodplain so platforms are allowed to flood, rather than become a barrier to the flood event and risk wider area flooding. The principal contractor will work with Natural Resources Wales to ensure they are signed up to all flood alerts and are identified on the priority list of contacts for flood warnings. Ongoing management procedures will be important to prevent impacts (e.g. storage of plant and materials away from floodplains, removal of plant from floodplain each night, construction of temporary works to be flood resilient).
- 24-hour lighting will be avoided as far as practicable. Where temporary and/or night lighting is required, this is required to be directional and pointed away from the functionally linked watercourses.
- Pre-construction survey results will be used to inform species-specific mitigation measures.
- Any drilling or piling will include a soft-start methodology. The soft-start methodology will involve a gradual increase in force and intensity of percussive piling or drilling, and hence, noise and vibration, over a 30-minute period to allow fish to move outside of the area of influence. The soft-start methodology would be required each time the machinery is started following a 30-minute rest period. Once the piling is in full operation, associated noise and vibration from the machinery will keep fish outside of the area of influence. This process will need to be repeated at the start of each day, as overnight working is not expected for construction works.

6.3.4 Integrity Test

With the inclusion of the mitigation measures mentioned in section 6.3.3, it is concluded that the plan is unlikely to give rise to an adverse effect on the integrity of the Severn Estuary SAC and Ramsar site.

6.3.5 In-combination Assessment

This section aims to consider the framework within which the plan is being developed to identify any possible in-combination effects of the plan with other projects and plans. This in-combination assessment is therefore focussed on plans that could have implications for the Severn Estuary sites. There exists the potential for many other plans and/or projects to interact with or have the potential to combine pressures and

threats, however, the in-combination assessment is a matter of applying a practical and realistic approach. In accordance with section 3.2.2, this includes proposals in adopted plans as well as draft plants that have been published or submitted for final consultation or adoption.

The review of other plans considered in the assessment is provided in Appendix D. The other plans detail how flood risk should be managed, outlining objectives and measures that could have beneficial outcomes for European sites, including water quality and hydrological condition, which also applies to the plan. Most of the plans defer to lower tier plans and projects in terms of HRA and the identification of required mitigation measures to avoid adverse effects to integrity as the plans were too broad to identify pathways of effects to specific designated sites. One notable issue is raised across various plans, in particular the Shoreline Management Plan (SMP)2[7], which is the loss of Atlantic salt meadows and intertidal mud and sandflats associated with holding the line, leading to potential impacts on bird populations. Habitat creation is required as part of stage 4 of HRA to compensate for habitat losses through coastal squeeze. However, as concluded in Appendix D, there are unlikely to be in combination effects given the types and scale of effects associated with this plan; the Cardiff LFRMS would not lead to the loss of equivalent habitats or associated impacts to bird populations, and indeed no permanent habitat loss is expected. It is concluded that this plan is unlikely to give rise to an adverse effect on the integrity of the Severn Estuary designated sites in combination with other plans and projects, on the basis that the mitigation measures outlined in Section 6.3.3. are implemented.

6.4 Summary

The appropriate assessment evaluates adverse impacts to the integrity of the Severn Estuary designated sites (SPA, SAC, and Ramsar site) associated with the proposed construction activities along the River Taff (Taf4 and Taf5) and in the Rhymney catchment (Rhy4 and Rhy5). Key risks comprise disturbance and harm to qualifying fish species and water quality degradation due to sedimentation and pollution. Without appropriate mitigation, these actions could have implications for achieving the conservation objectives, particularly relating to harm and disturbance to migrating species such as river lamprey, sea lamprey, Atlantic salmon, sea trout and European eel. However, the inclusion of specific mitigation measures, such as timing the works to avoid sensitive periods and adherence to water quality protection and biosecurity protocols significantly reduces these risks.

It is considered that, given the implementation of the mitigation measures proposed, that the plan is unlikely to give rise to adverse effects on the integrity of the Severn Estuary sites (beyond reasonable scientific doubt), and therefore there are no likely significant effects in combination with other plans and projects. These mitigation measures would need to be implemented as part of the projects proposed by the plan and subject to further assessment under project HRAs.

7. Conclusions

Arup has been appointed by the City of Cardiff Council to provide information to inform stages 1 and 2 of an HRA for their LFRMS. Likely significant effects could not be ruled out with respect to the Severn Estuary SAC, SPA and Ramsar site due to habitat loss and degradation, disturbance and harm and changes to water quality. The plan is unlikely to have an adverse impact on the integrity of the Severn Estuary designated sites providing that appropriate mitigation measures are adopted and implemented during construction, including the careful timing of works, supervision by qualified personnel, pollution prevention protocols and strict biosecurity measures. These mitigation measures are considered to be sufficient to ensure that the plan would not hinder European sites from achieving their conservation objectives.

Appendix A

Designated Sites

A.1 Severn Estuary

Designation	SAC	SPA	Ramsar
Site Area	73714.11 ha	24487.91 ha	24662.98 ha

Qualifying Features	Annex I habitats that are the primary reason for selection of this site: • 1130: Estuaries • 1140: Mudflats and sandbanks not covered by sea water at low tide • 1330: Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Annex I habitats present as a qualifying feature, but not primary reason for selection of this site: • 1110: Sandbanks which are slightly covered by sea water at all times • 1170: Reefs Annex II species that are the primary reason for selection of this site: • 1095: Sea lamprey *Petromyzon marinus* • 1099: River lamprey *Lampetra fluviatilis* • 1103: Twaite shad *Alosa fallax*	The site qualifies under Article 4.1 of the Birds Directive by supporting populations of designated importance of the following species listed in Annex I: • Bewick swan *Cygnus columbianus bewickii* 3.9% of the wintering population in Great Britain (1991/2 -1995/6 5-year peak mean). The site qualifies under Article 4.2 by supporting populations of designated importance of the following migratory species: • Gadwall *Anas strepera* 0.9% of the wintering population in North-western Europe (1991/2 -1995/6 5-year peak mean); • Greater white-fronted goose *Anser albifons albifons* 0.4% of the wintering population in North-western Siberia and Northern Europe (1991/2 -1995/6 5-year peak mean); • Dunlin *Calidris aplina alpina* 3.3% of the wintering population from Northern Siberia, Europe and Western Africa (1991/2 -1995/6 5-year peak mean); • Common redshank *Tringa totanus* 1.3% of the wintering population in the Eastern Atlantic (1991/2 -1995/6 5-year peak mean), and • Common shelduck *Tadorna tadorna* 1.1% of the wintering population in North-western Europe (1991/2 -1995/6 5-year peak mean). Over winter the area regularly supports in excess of 20,000 waterfowl (5 year peak mean 01/04/1998 = 84317).	Sites containing representative, rare or unique natural and near-natural wetland types with the biogeographic region (Criterion 1): Due to the immense tidal range (second largest in the world), this affects both the physical environment and biological communities. Habitats Directive Annex I features include: • Sandbanks which are slightly covered by sea water all the time; • Estuaries; • Mudflats and sandflats not covered by seawater at low tide; and • Atlantic salt meadows. Sites supporting populations of plants and/or animals important for maintaining the biological diversity of the biogeographic region (Criterion 3): • Unusual estuarine communities of reduced diversity and high productivity Sites supporting plant or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions (Criterion 4): • This site is important for the run of migratory fish between the sea/estuaries and freshwater rivers. Species include salmon, sea trout, sea lamprey, river lamprey, allis shad, twaite shad and eel. It is also of particular importance for migratory birds during spring and autumn. Sites regularly supporting in excess of 20,000 waterfowl (Criterion 5): • 70,919 waterfowl (5 year peak mean 1998/9 – 2002/2003)

Designation	SAC	SPA	Ramsar
			Sites regularly supporting 1% of the individuals in a population of one species or subspecies of waterfowl (Criterion 6): • Bewick's Swan – 2.8% of the winter population in Great Britain (5 year peak mean 1998/9 – 2002/2003) • White-fronted goose – 35.8% of the winter population in Great Britain (5 year peak mean 1998/9 – 2002/2003) • Shelduck – 1% of the winter population (5 year peak mean 1998/9 – 2002/2003) • Gadwall – 1.4% of the winter population in Great Britain (5 year peak mean 1998/9 – 2002/2003) • Dunlin – 1.8% of the winter population (5 year peak mean 1998/9 – 2002/2003) • Redshank – 1% of the winter population (5 year peak mean 1998/9 – 2002/2003) Sites containing an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks depend (Criterion 8): • Over 110 species of fish have been recorded within the whole estuarine and river system. Salmon, sea trout, sea lamprey, river lamprey, allis shad, twaite shad and eel use the estuary as a key migration route to their spawning grounds in the many tributaries of the Severn. The site is also an important feeding and nursery ground for many fish species, particularly allis and twaite shad which feed on shrimps within the salt wedge.

Designation	SAC	SPA	Ramsar
Pressures and Threats	Negative impacts: • Human induced changes in hydraulic conditions • Changes in abiotic conditions • Modification of cultivation practices • Other urbanisation, industrial and similar activities • Outdoor sports and leisure activities, recreational activities • Public access/disturbance • Physical modification • Impacts of development • Coastal squeeze • Change in land management • Changes in species distributions • Water pollution • Air pollution: impact of atmospheric nitrogen deposition • Marine consents and permits: minerals and waste • Fisheries: recreational marine and estuarine • Invasive species • Marine litter • Marine pollution incidents Positive impacts: • Modification of cultivation practices • Interpretative centres • Improved access to site • Grazing	Negative impacts: • Human induced changes in hydraulic conditions • Changes in abiotic conditions • Modification of cultivation practices • Other urbanisation, industrial and similar activities • Outdoor sports and leisure activities, recreational activities • Public access/disturbance • Physical modification • Impacts of development • Coastal squeeze • Change in land management • Changes in species distributions • Water pollution • Air pollution: impact of atmospheric nitrogen deposition • Marine consents and permits: minerals and waste • Fisheries: recreational marine and estuarine • Invasive species • Marine litter • Marine pollution incidents Positive impacts: • Modification of cultivation practices • Interpretative centres • Mowing / cutting of grassland • Grazing • Improved access to site	• Dredging • Erosion • Recreational / tourism disturbance

Conservation Objectives	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring: • The extent and distribution of qualifying natural habitats and habitats of qualifying species; • The structure and function (including typical species) of qualifying natural habitats; • The structure and function of the habitats of qualifying species; • The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely; • The populations of qualifying species; and • The distribution of qualifying species within the site. The conservation objective for the "estuaries" feature is to maintain the feature in favourable condition, as defined below: The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met: • the total extent of the estuary is maintained; • the characteristic physical form (tidal prism/cross sectional area) and flow (tidal regime) of the estuary is maintained; • the characteristic range and relative proportions of sediment sizes and sediment budget within the site is maintained; • the extent, variety and spatial distribution of estuarine habitat communities within the site is maintained; • the extent, variety, spatial distribution and community composition of hard substrate habitats and their notable communities is maintained;	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring: • The extent and distribution of qualifying natural habitats and habitats of qualifying species; • The structure and function (including typical species) of qualifying natural habitats; • The structure and function of the habitats of qualifying species; • The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely; • The populations of qualifying species; and • The distribution of the qualifying species within the site. The conservation objective is to maintain the Bewick's swan population and its supporting habitats in favourable condition, as defined below. The interest feature Bewick's swan will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met: • the 5 year peak mean population size for the Bewick's swan population is no less than 289 individuals (i.e. the 5 year peak mean between 1988/9 - 1992/3); • the extent of saltmarsh at the Dumbles is maintained; • the extent of intertidal mudflats and sandflats at Frampton Sands, Waveridge Sands and the Noose is maintained; • the extent of vegetation with an effective field size of >6 ha and with unrestricted bird sightlines > 500m at feeding, roosting and refuge sites are maintained;	The conservation objective for the estuaries feature is to maintain the feature in favourable condition, as defined by the conservation objective for the SAC "estuaries feature". This includes: • Estuarine habitat communities • Hard substrate communities • Notable estuarine species assemblages (migratory, estuarine, marine, and freshwater species) • Assemblage of waterfowl species • Assemblage of vascular plant species. The conservation objective for the "assemblage of migratory fish species" feature is to maintain the feature in favourable condition. This requires each of the following conditions to be met: • Migratory passage of both adults and juveniles through the Severn Estuary between the Bristol Channel and any of their spawning rivers is not obstructed / impeded by physical barriers, changes in flows or poor water quality. • Size of population of the assemblages species in the Severn Estuary and rivers which drain into it, is at least maintained and at a level that is sustainable in the long term. • Abundance of prey species forming the principal food resources for the assemblage species within estuary, is maintained. • Toxic contaminants in the water column and sediment are below levels which would pose a risk to the ecological objectives described above. The conservation objectives for the "Bewick's swan", "European white-fronted goose", "Dunlin", "Redshank", "Shelduck", and "Gadwall" features of the Severn Estuary Ramsar Site (Ramsar interest features 3 – 9) is to maintain all features in

	• the abundance of the notable estuarine species assemblages is maintained or increased; • the physico-chemical characteristics of the water column support the ecological objectives described above; • Toxic contaminants in water column and sediment are below levels which would pose a risk to the ecological objectives described above. • Airborne nutrient and contaminant loads are below levels which would pose a risk to the ecological objectives described above The conservation objective for the "subtidal sandbanks" feature is to maintain the feature in favourable condition, as defined below: The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met: • the total extent of the subtidal sandbanks within the site is maintained; • the extent and distribution of the individual subtidal sandbank communities within the site is maintained; • the community composition of the subtidal sandbank feature within the site is maintained; • the variety and distribution of sediment types across the subtidal sandbank feature is maintained; • the gross morphology (depth, distribution and profile) of the subtidal sandbank feature within the site is maintained. The conservation objective for "mudflats and sandflats" feature is to maintain the feature in favourable condition, as defined below: The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:	• greater than 25% cover of suitable soft leaved herbs and grasses in winter season throughout the transitional saltmarsh at the Dumbles is maintained; • aggregations of Bewick's swan at feeding, roosting and refuge sites are not subject to significant disturbance. The conservation objective is to maintain the European white-fronted goose population and its supporting habitats in favourable condition, as defined below. The interest feature European white-fronted goose will be considered to be in favourable condition2 when, subject to natural processes, each of the following conditions are met: • the 5 year peak mean population size for the wintering European white fronted goose population is no less than 3,002 individuals (ie the 5 year peak mean between 1988/9-1992/3); • the extent of saltmarsh at the Dumbles is maintained; • the extent of intertidal mudflats and sandflats at Frampton Sands, Waveridge Sands and the Noose; • greater than 25% cover of suitable soft-leaved herbs and grasses is maintained during the winter on saltmarsh areas; • unrestricted bird sightlines of >200m at feeding and roosting sites are maintained; • aggregations of European white-fronted goose at feeding or roosting sites are not subject to significant disturbance. The conservation objective is to maintain the dunlin population and its supporting habitats in favourable condition, as defined below. The interest feature dunlin will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:	favourable condition, as defined by the conservation objective for the SPA feature for each species. The conservation objective for the "internationally important assemblage of waterfowl" feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SPA "internationally important assemblage of waterfowl" feature.

	• The total extent of the mudflats and sandflats feature is maintained; • the variety and extent of individual mudflats and sandflats communities within the site is maintained; • the distribution of individual mudflats and sandflats communities within the site is maintained; • the community composition of the mudflats and sandflats feature within the site is maintained; • the topography of the intertidal flats and the morphology (dynamic processes of sediment movement and channel migration across the flats) are maintained. The conservation objective for the "Atlantic salt meadow" feature is to maintain the feature in favourable condition, as defined below: The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met: • the total extent of Atlantic salt meadow and associated transitional vegetation communities within the site is maintained; • the extent and distribution of the individual Atlantic salt meadow and associated transitional vegetation communities within the site is maintained; • the zonation of Atlantic salt meadow vegetation communities and their associated transitions to other estuary habitats is maintained; • the relative abundance of the typical species of the Atlantic salt meadow and associated transitional vegetation communities is maintained; • the abundance of the notable species of the Atlantic salt meadow and associated transitional vegetation communities is maintained.	• the 5 year peak mean population size for the wintering dunlin population is no less than 41,683 individuals (i.e. the 5 year peak mean between 1988/9 - 1992/3); • the extent of saltmarsh and associated strandlines is maintained; • the extent of intertidal mudflats and sandflats is maintained; • the extent of hard substrate habitats is maintained; • the extent of vegetation with a sward height of 200m at feeding and roosting sites are maintained; • aggregations of dunlin at feeding or roosting sites are not subject to significant disturbance. The conservation objective is to maintain the redshank population and its supporting habitats in favourable condition, as defined below. The interest feature redshank will be considered to be in favourable condition when, subject to natural processes each of the following conditions are met: • the 5 year peak mean population size for the wintering redshank population is no less than 2,013 individuals (i.e. the 5 year peak mean between 1988/9 - 1992/3); • the extent of saltmarsh and associated strandlines is maintained; • the extent of intertidal mudflats and sandflats is maintained; • the extent of hard substrate habitats is maintained; • the extent of vegetation with a sward height of 200m at feeding and roosting sites are maintained; • aggregations of redshank at feeding or roosting sites are not subject to significant disturbance.	

	• the structural variation of the salt marsh sward (resulting from grazing) is maintained within limits sufficient to satisfy the requirements of conditions iv and v above and the requirements of the Ramsar and SPA features • the characteristic stepped morphology of the salt marshes and associated creeks, pills, drainage ditches and pans, and the estuarine processes that enable their development, is maintained. • Any areas of *Spartina anglica* salt marsh (SM6) are capable of developing naturally into other saltmarsh communities. The conservation objective for the "reefs" feature is to maintain the feature in a favourable condition, as defined below: The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met: • the total extent and distribution of *Sabellaria* reef is maintained; • the community composition of the *Sabellaria* reef is maintained; • the full range of different age structures of *Sabellaria* reef are present; • the physical and ecological processes necessary to support *Sabellaria* reef are maintained The conservation objective for the river lamprey feature is to maintain the feature in a favourable condition, as defined below: The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met: • the migratory passage of both adult and juvenile river lamprey through the Severn Estuary between the Bristol Channel and any of their spawning rivers is not obstructed or impeded by physical barriers, changes in flows, or poor water quality;	The conservation objective is to maintain the shelduck population and its supporting habitats in favourable condition, as defined below: The interest feature shelduck will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met: • the 5 year peak mean population size for the wintering shelduck population is no less than 2,892 individuals (i.e. the 5 year peak mean between 1988/9 - 1992/3); • the extent of saltmarsh is maintained; • the extent of intertidal mudflats and sandflats is maintained; • the extent of hard substrate habitats is maintained; • the abundance and macro-distribution of suitable invertebrates3 in intertidal mudflats and sandflats is maintained; • unrestricted bird sightlines of >200m at feeding and roosting sites are maintained; • aggregations of shelduck at feeding or roosting sites are not subject to significant disturbance. The conservation objective is to maintain the gadwall population and its supporting habitats1 in favourable condition, as defined below: The interest feature gadwall will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met: • the 5 year peak mean population size for the wintering gadwall population is no less than 330 (ie the 5 year peak mean between 1988/9 - 1992/3); • the extent of intertidal mudflats and sandflats is maintained; • unrestricted bird sightlines of >200m at feeding and roosting sites are maintained;	

	• the size of the river lamprey population in the Severn Estuary and the rivers which drain into it, is at least maintained and is at a level that is sustainable in the long term; • the abundance of prey species forming the river lamprey's food resource within the estuary, is maintained. • toxic contaminants in the water column and sediment are below levels which would pose a risk to the ecological objectives described above. The conservation objective for the sea lamprey feature is to maintain the feature in a favourable condition, as defined below: The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met: • the migratory passage of both adult and juvenile sea lamprey through the Severn Estuary between the Bristol Channel and any of their spawning rivers is not obstructed or impeded by physical barriers, changes in flows, or poor water quality; • the size of the sea lamprey population in the Severn Estuary and the rivers which drain into it, is at least maintained as is at a level that is sustainable in the long term; • the abundance of prey species forming the sea lamprey's food resource within the estuary, is maintained. • toxic contaminants in the water column and sediment are below levels which would pose a risk to the ecological objectives described above. The conservation objective for the twaite shad feature is to maintain the feature in a favourable condition, as defined below: The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met: • the migratory passage of both adult and juvenile twaite shad through the Severn Estuary between the Bristol Channel and their spawning rivers is	• aggregations of gadwall at feeding or roosting sites are not subject to significant disturbance. The conservation objective is to maintain the waterfowl assemblage and its supporting habitats in favourable condition, as defined below: The interest feature waterfowl assemblage will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met: • the 5 year peak mean population size for the waterfowl assemblage is no less than 68,026 individuals (ie the 5 year peak mean between 1988/9 - 1992/3); • the extent of saltmarsh and their associated strandlines is maintained; • the extent of intertidal mudflats and sandflats is maintained; • the extent of hard substrate habitats is maintained; • extent of vegetation of 500m at feeding and roosting sites are maintained; • waterfowl aggregations at feeding or roosting sites are not subject to significant disturbance.	

Designation	SAC	SPA	Ramsar
	not obstructed or impeded by physical barriers, changes in flows or poor water quality; • the size of the twaite shad population within the Severn Estuary and the rivers draining into it is at least maintained and is at a level that is sustainable in the long term. • the abundance of prey species forming the twaite shad's food resource within the estuary, in particular at the salt wedge, is maintained. • toxic contaminants in the water column and sediment are below levels which would pose a risk to the ecological objectives described above.		
Condition Summary for Qualifying Features	• Estuaries - unfavourable • Mudflats and sandflats not covered by seawater at low tide - unfavourable • Atlantic salt meadows *Glauco-Puccinellietalia maritimae* - unfavourable • Sandbanks which are slightly covered by seawater all the time - favourable • Reefs - unknown • Sea lamprey - unfavourable • River lamprey - unfavourable • Twaite shad - unfavourable	• Bewick's swan (wintering) - unfavourable • European white-fronted goose (wintering) - unfavourable • Dunlin (wintering) - unfavourable • Redshank (wintering) - favourable • Shelduck (wintering) - favourable • Gadwall (wintering) - unfavourable • Waterbird assemblage (wintering) - favourable	

A.2 Cardiff Beech Woods

Designation	SAC
Site Area	114.45 ha
Qualifying Features	Annex I habitats that are a primary reason for selection of this site: • 9130 *Asperulo-Fagetum* beech forests. Cardiff Beech Woods contains one of the largest concentrations of Asperulo-Fagetum beech forests in Wales, and represent the habitat close to the western limit of its past native range in both the UK and Europe. The woods show mosaics and transitions to other types, including more acidic beech woodland and oak *Quercus* and ash *Fraxinus excelsior* woodland. Characteristic and notable species in the ground flora include ramsons *Allium ursinum*, sanicle *Sanicula europaea*, bird's-nest orchid *Neottia nidus-avis* and yellow bird's-nest *Monotropa hypopitys.* Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: • 9180 *Tilio-Acerion* forests of slopes, screes and ravines
Pressures and Threats	Negative impacts: • Interspecific floral relations • Invasive non-native species • Outdoor sports and leisure activities, recreational activities Positive impacts: • Biocenotic evolution, succession

Conservation Objectives	Feature 1: *Asperulo-Fagetum* beech forest (EU Habitat Code 9130). The vision for this feature is for it to be in a favourable conservation status, where all the following conditions are satisfied: • The existing *Asperulo-fagetum* beech forest will be maintained. • At least 95% of canopy forming trees will be locally native species such as beech, ash and oak, with some areas dominated by beech. • The tree canopy will not be completely closed; approximately 10% of the canopy will include a dynamic shifting pattern of gaps encouraging natural regeneration of tree species of all ages. • Dead wood, standing and fallen, will be maintained where possible to provide habitat for invertebrates, fungi and other woodland species. • There are pockets of ground flora across the site, comprising species typical of lime-rich beech wood, including indicators of ancient woodland such as wood anemone, ramsons and sanicle. • There is little evidence of browsing or squirrel damage to trees. • Recreational use of the site will continue to be managed so it does not damage the wildlife interest of the site. • All factors affecting the achievement of these conditions are under control. Feature 2: *Tilio-Acerion* forest of slopes, screes and ravines (EU Habitat Code 9180). The vision for this feature is for it to be in a favourable conservation status, where all the following conditions are satisfied: • The existing *Tilio-acerion* forest will be maintained. • At least 95% of canopy forming trees will be locally native species (sycamore included). • The tree canopy will not be completely closed; approximately 10% of the canopy will include a dynamic shifting pattern of gaps encouraging natural regeneration of tree species of all ages. • Dead wood, standing and fallen, will be maintained where possible to provide habitat for invertebrates, fungi and other woodland species. • There are pockets of ground flora across the site, comprising species typical of lime-rich beech wood, including indicators of ancient woodland such as wood anemone, ramsons and sanicle. • There is little evidence of browsing or squirrel damage to trees. • Recreational use of the site will continue to be managed so it does not damage the wildlife interest of the site. • All factors affecting the achievement of these conditions are under control.
Condition Summary for Qualifying Features	• *Asperulo-Fagetum* beech forests - favourable • *Tilio-Acerion* forest of slopes, screes and ravines - unfavourable • Semi-natural Broadleaved Woodland - favourable • *Porrhomma rosenhaueri* (a cave dwelling spider) - favourable • Geological exposures - favourable

Appendix B

Screening Schedule

Element of the Plan	Assessment	Conclusion
Chapters 1, 2, 3, 4 and 5	Administrative text	Screened out
Chapter 6: Our Strategic Objectives	General aspirations	Screened out
Chapter 7: Measures 1-26	General statements of broad objectives	Screened out
Chapter 8: Flood Action CDFA1	Category F – Maintaining the Flood Risk Page cannot lead to development or other change	Screened out
Chapter 8: Flood Action CDFA2	Category G – This action relates to preparation of a surface water management policy, which would steer development towards favourable measures to mitigate surface water flooding. The policy would not propose development and would provide a high-level framework that could lead to changes in terms of how developments are designed. On the basis that it is guided by Tan 15[29] or similar, it has been assessed that these changes would be beneficial in terms of managing run-off from sites, using measures such as Sustainable Drainage Systems (SuDS) that would lower flood risk by reducing the quantity of surface water run-off and delaying its discharge to watercourses. It is therefore assessed that this action could not have any conceivable effect on a designated site.	Screened out
Chapter 8: Flood Action CDFA3	Category F – Maintaining and updating a flood risk asset database cannot lead to development or other change	Screened out
Chapter 8: Flood Action CDFA4	Category F – Supply of flood risk asset data cannot lead to development or other change	Screened out
Chapter 8: Flood Action CDFA5	Category F – Review and maintenance of the flooding emergency response plan cannot lead to development or other change	Screened out
Chapter 8: Flood Action CDFA6	Category F – Assisting Natural Resources Wales in the mitigation of flood risk cannot lead to development or other change	Screened out
Chapter 8: Flood Action CDFA7	Category F – Developing local flood risk groups cannot lead to development or other change	Screened out
Chapter 8: Flood Action CDFA8	Category F – Providing educational facilities with resources relating to flooding cannot lead to development or other change	Screened out
Chapter 8: Flood Action CDFA9	Category F – Measures to remove surface water from public sewerage systems cannot lead to development or other change	Screened out
Chapter 8: Flood Action CDFA10	Category F – Adherence to best practice in Section 19 flood investigation reports cannot lead to development or other change	Screened out
Chapter 8: Flood Action CDFA11	Category F – Maintenance of telemetry to capture rainfall and water levels cannot lead to development or other change	Screened out
Chapter 8: Flood Action CDFA12	Category F – This policy commits to maintaining funding, which itself cannot lead to development or other change. The following schemes to be supported by the funding to be sustained through this policy are assessed under the relevant actions below: • Construction of coastal defences on Rhymney Estuary (Rhy1); • Greener Rumney construction (Rhy3); • Greener Whitchurch construction (Taf3); • Radyr Court Road construction (Taf5); and • Nant Y Wedal construction (Taf8).	Screened out

[29] The Welsh Assembly Government (2004); 'Planning Policy Wales Technical Advice Note 15: Development and Flood Risk.'

Chapter 8: Flood Action CDFA13	Category G – This work involves updating the existing culverting policy. The policy discourages culverting and encourages the naturalisation of watercourses. The policy aims to steer development towards measures that would have beneficial ecological outcomes and such measures could benefit the Severn Estuary designated sites through naturalising river catchments that flow into the Severn Estuary. Updates to the policy would be minor and not linked to development that could have implications for qualifying features or are otherwise assessed to be beneficial. Culverting policy updates could not have any conceivable effect on a designated site.	Screened out
Chapter 8: Flood Action CDFA14	Category F – Sandbag policy updates cannot lead to development or other change.	Screened out
Chapter 8: Flood Action CDFA15	Category F – Development of guidance documents cannot lead to development or other change.	Screened out
Chapter 8: Flood Action CDFA16	Category G – Development of the Green Infrastructure Plan could lead to the incorporation of green corridors and other such measures as part of development; however, there is no potential for these to undermine the conservation objectives of designated sites. Indeed, any such effects could be beneficial.	Screened out
Chapter 8: Flood Action CDFA17	Category F – Review of the adopted plan every two years cannot lead to development or other change beyond those assessed under other actions.	Screened out
Chapter 8: Flood Action CDFA18	Category C – The Strategic Flood Consequences Assessment (SFCA) provides evidence for and informs other plans, particularly the local plan, which is not proposed by the plan and therefore is not assessed in this report. Furthermore, development of the replacement Local Development Plan (LDP) has potential to impact designated sites, however this is not proposed by the plan under assessment; the LDP is subject to a separate HRA process and therefore is screened out from likely significant effects alone.	Screened out
Chapter 8: Flood Action CDFA19	Category C – The Shoreline Management Plan (SMP)[7] is an existing document that has been subject to a separate HRA process. Updates to the plan are therefore screened out from likely significant effects alone.	Screened out
Chapter 8: Flood Action CDFA20	Category C – This action requires adherence to an element of the SMP which is not proposed by the plan and is therefore screened out from likely significant effects alone.	Screened out
Chapter 8: Flood Action CDFA21	Category F – Development of coordinated plans with neighbouring risk management authorities cannot lead to development or other change.	Screened out
Chapter 8: Flood Action Ely1	Category F – Developing local flood risk groups cannot lead to development or other change	Screened out
Chapter 8: Flood Action Ely2	Category F – Developing local flood risk groups cannot lead to development or other change	Screened out
Chapter 8: Flood Action Rhy1	Category C – The construction of coastal defences on Rhymney Estuary has been subject to a separate HRA and has been approved at stage 4. These works are not proposed by the plan and are therefore screened out from likely significant effects alone.	Screened out
Chapter 8: Flood Action Rhy2	Category F – Flood risk talks in schools cannot lead to development or other change	Screened out
Chapter 8: Flood Action Rhy3	Category I – Developing a Full Business Case (FBC) (detailed design) for Greener Rumney could lead to development as assessed under Rhy4.	Screened in
Chapter 8: Flood Action Rhy4	Category I – The Outline Business Case (OBC)[22] identifies the study area as a mature residential suburb within the Rhymney River catchment approximately 1.15km north of the Severn Estuary SPA, Ramsar and SAC. The proposals involve measures to mitigate surface water flooding to manage peak water flows within the catchment. The preferred option 2 involves: the creation of a wetland in the playing fields; widening of the northern brook; the construction of swales and ponds; a new surface water pipe network; and rain gardens. Many of these features would incorporate diverse planting to provide an ecological enhancement. It is understood that there are no works proposed within or alongside the Rhymney River itself. The Rhymney River catchment is hydrologically connected to the tidal section of the Rhymney River, which flows into the Severn Estuary designated sites. Therefore, there is a pathway for the proposed works associated with the FBC to impact these designated sites.	Screened in
Chapter 8: Flood Action Taf1	Category C - Input to the River Taff Catchment Masterplan could lead to actions that have implications for the Severn Estuary designated sites. However, this is not proposed by the plan and is therefore screened out from likely significant effects alone.	Screened out

Chapter 8: Flood Action Taf2	Category H – Developing an FBC for Greener Whitchurch could lead to development as assessed under Taf3.	Screened out
Chapter 8: Flood Action Taf3	Category H – With reference to the Environmental Impact Assessment (EIA) Screening Report[30] and Outline Business Case (OBC)[31], the scheme involves the implementation of various measures in Whitchurch, approximately 6.74km northwest of the Severn Estuary designated sites, to reduce flood risk downstream along Whitchurch Brook. The study area is hydrologically connected via Whitchurch Brook, which flows into the River Taff, which is connected to the Severn Estuary designated sites via Cardiff Bay. As assessed in the EIA Screening Report, construction site best practice guidelines would be implemented as part of a CEMP or similar. The proposed works would result in hydrological changes within the River Taff catchment, which could alter flows into the Severn Estuary. However, these changes would be insignificant within the wider context of the Severn Estuary designated sites. As such, the works cannot undermine the conservation objectives of the Severn Estuary designated sites.	Screened out
Chapter 8: Flood Action Taf4	Category I - Preparation of the Radyr Court Road Business Justification Case (BJC) could lead to development as assessed under action Taf5.	Screened in
Chapter 8: Flood Action Taf5	Category I - Radyr Court Road construction involves repairs to failing flood defences along the River Taff to prevent flooding, which could have implications for the Severn Estuary designated sites. The proposed works are located approximately 7.29km northwest of these sites. There are no published details available for these works beyond a site plan. These are to be developed following preparation of the BJC. However, it is understood that the gabion baskets along the river are failing, meaning that it is likely that works will be required within and along the banks of the river, involving a cofferdam to reduce the width of the water and enable access to the toe of the flood defences within the river (City of Cardiff Council, personal communication). It is assumed that the cofferdam would span approximately 2-3 metres (m) into the river channel and that this will involve the removal of debris and vegetation within the site and dewatering the area behind the cofferdam with pumps. There would also be a requirement to remove trees along the banks. The River Taff flows into the Severn Estuary and is hydrologically connected to the Severn Estuary designated sites and therefore there is a pathway for the proposed works to impact these sites.	Screened in
Chapter 8: Flood Action Taf6	Category H - Nant Y Wedal Outline Business Case (OBC) could lead to development as assessed under action Taf8.	Screened out
Chapter 8: Flood Action Taf7	Category H - Nant Y Wedal FBC could lead to development as assessed under action Taf8.	Screened out
Chapter 8: Flood Action Taf8	Category H - Nant Y Wedal construction would involve works relating to the Nant Y Wedal watercourse to reduce the risk of flooding from the watercourse. The study area is located within an urban area of Cardiff approximately 4.20km northwest from the Severn Estuary designated sites. An options appraisal has not yet been undertaken and there are no published details regarding the proposed works. City of Cardiff Council has advised that the plan would involve the creation of rain gardens and swales to remove water from a culvert (personal communication). It is unclear based on online mapping whether Nant Y Wedal is hydrologically connected to the Severn Estuary designated sites. However, on the assumption that it flows into the River Taff (approximately 1.12km to the southwest) (which is likely based on personal communication with City of Cardiff Council), there would be hydrological changes within the River Taff catchment, which could alter flows into the Severn Estuary. However, these changes would be insignificant within the wider context of the Severn Estuary designated sites. Considering the implementation of best practice measures, the works cannot undermine the conservation objectives of the Severn Estuary designated sites.	Screened out
Chapter 8: Flood Action Flh1	Category C – The T98 asset survey is a non-intrusive visual survey of the coastline as required by the SMP, which has been assessed by a separate plan level HRA. There is potential for the survey to identify works required to maintain the coastline, which could have implications for Severn Estuary designated sites, however this would require an update to the HRA.	Screened out
Chapter 9	Administrative text	Screened out
Chapter 10	Administrative text	Screened out

Chapter 11	Administrative text	Screened out

[30] Arup, (2023); 'Whitchurch Brook Flood Risk Management Scheme EIA Screening Opinion Request.'

[31] Arup, (2020); 'Whitchurch Brook Flood Risk Management Scheme Outline Business Case.'

Appendix C

River Taff Species Records from Natural Resources Wales

Common Name	Common Name
Barbel	*Barbus barbus*
Sea trout	*Salmo trutta*
Bullhead	*Cottus gobio*
Carp	*Cyprinus carpio*
Chub	*Squalius cephalus*
Dace	*Leuciscus leuciscus*
European eel	*Anguilla anguilla*
Grayling	*Thymallus thymallus*
Gudgeon	*Gobio gobio*
Lamprey - Brook	*Lampetra planeri*
Lamprey - River	*Lampetra fluviatilis*
Lamprey - Sea	*Petromyzon marinus*
Minnow	*Phoxinus Phoxinus*
Perch	*Perca fluviatilis*
Pike	*Esox lucius*
Roach	*Rutilus rutilus*
Salmon	*Salmo salar*
Stone loach	*Barbatula barbatula*

Appendix D

In-Combination Assessment

Plan	Summary of the Plan	Potential for In-combination Effects
National		
The National Strategy for Flood and Coastal Erosion Risk Management (FCERM) in Wales[3]	This is the second national strategy on FCERM for Wales, replacing the 2011 strategy. This strategy sets out how the Welsh Government intends to manage the risks from flooding and coastal erosion across Wales. It sets objectives and measures for all partners to work towards.	An HRA was developed iteratively with the Strategy[32], however it was not available for review based on an online search. The Strategic Environmental Assessment (SEA) makes reference to the conclusions of the HRA, which highlights significant adverse effects associated with Objective B relating to holding the line and employing hard engineering solutions for coastal defences (refer to the in-combination assessment for the SMP2[7] below). The strategy promotes Natural Flood Management but recognises that hard engineering will continue to be necessary. It is concluded that there are unlikely to be in-combination effects of the plan in conjunction with the National Strategy for FCERM in Wales, given the types and scale of effects associated with the plan.
National FCERM Strategy for England[33]	This strategy describes what needs to be done by all risk management authorities (RMAs) involved in flood and coastal erosion risk management for the benefit of people and places. They must exercise their FCERM activities, including plans and strategies, consistently with the strategy.	The HRA[34] assesses that many FCERM activities are capable of adversely affecting Annex 1 habitats and species groups associated with the Severn Estuary designated sites, including riverine habitats, fish and birds. However, designations are not specified as the plan would be implemented nationally and is not spatially specific. It concludes that, in practice, the actual impact on designated sites would need to be assessed through lower-level strategies, plans, projects and activities later in the planning and implementation process. The HRA indicates that there are pathways of impact to qualifying features that are relevant to this assessment, however, in-combination effects have not been identified as the National Strategy is too broad. However, in-combination effects are unlikely given the scale and nature of effects associated with the plan.
Natural Resources Wales Flood Risk Management Plan (FRMP): National overview[35]	This FRMP covers all of Wales and provides information on the scale of flood risk, as well as Natural Resources Wales's priorities in managing the risk of flooding, and measures that are proposed over the next six years. This FRMP covers flooding from rivers, reservoirs and the sea.	The HRA[36] concludes that the criteria for deferring down the HRA to lower tier plans, programmes and projects are met and they can be delivered without causing adverse effects on site integrity. There was insufficient detail within national and local measures and too much uncertainty about associated project options to robustly predict the likelihood and significance of effects. The report outlines a series of measures and approaches, which, along with an appropriately detailed HRA, will ensure that mitigation is implemented to avoid impacts on site integrity. Considering that the National FRMP for Wales provides an overarching strategy for the Cardiff FRMS, appropriate measures are outlined in this report as highlighted, and the scale and nature of effects associated with the plan, no likely in-combination effects have been identified.
Regional		
Natural Resources Wales FRMP: South Central Wales Place[37]	This FRMP covers south central Wales including the City of Cardiff.	The HRA[36] identifies measures within the South Central Wales area, including SC36 Develop an integrated catchment approach flood risk management for the River Taff catchment, which could be relevant. However, as described above in relation to the National Strategy for Wales, the measures are generic, and the report defers to lower tier plans, programmes and projects for appropriate assessments. Considering that the regional FRMP provides an overarching strategy for the Cardiff FRMS, appropriate measures are outlined in this report as highlighted, and the scale and nature of effects associated with the plan, no likely in-combination effects have been identified.

[32] Welsh Government, (2020); 'Strategic Environmental Assessment: Environmental Report. Flood and Coastal Erosion Risk Management: Development of a National Strategy for Wales.'

[33] Environment Agency, (2020); 'National Flood and Coastal Erosion Risk Management Strategy for England.'

[34] Environment Agency, (2020); 'National Flood and Coastal Erosion Risk Management Strategy for England: Summary Report of Habitats Regulations Assessment Process.'

[35] Natural Resources Wales, (2023); 'Natural Resources Wales Flood Risk Management Plan: National overview.'

[36] Natural Resources Wales, (2023); 'Habitats Regulations Assessment of the second cycle Natural Resources Wales Flood Risk Management Plan Version 2: Final Version for consultation with Appropriate Nature Conservation Bodies November 2023.'

[37] Natural Resources Wales, (2023); 'Natural Resources Wales Flood Risk Management Plan (FRMP): South Central Wales Place.'

Severn River Basin District Flood Risk Management Plan (FRMP) 2021 to 2027[38]	The second cycle FRMP is a plan to manage significant flood risks in the Flood Risk Areas identified in the Severn River Basin District (RBD). It covers the part of the RBD that is in England. It is aligned with the Severn River Basin Management Plan: updated 2022[39], which covers the part that is in Wales.	The HRA[40] concludes that none of the measures were identified to result in likely significant effects on any European site, broadly because the plan is too non-specific or relates to activities already consented. However, one group of measures commits to physical work on the ground by implementing flood management interventions, such as coastal defence structures or natural flood management approaches. Detailed HRA was deferred to lower tier plans and projects. The HRA also identified measures that could improve the hydrological condition and water quality in European sites, which is also applicable to the Cardiff FRMS. No in-combination effects were identified. Whilst there are potential impact pathways to Severn Estuary SAC and Ramsar site that are aligned, including opportunities for beneficial outcomes, the nature of the Severn RBD FRMP is such that in-combination effects have not been identified.
Welsh part of the Severn River Basin Management Plan (2021-2027)**Error! Bookmark not defined.**	This document is part of the latest update to the Severn RBD and relates to the Welsh part of the Severn RBD only. The plan sets the objectives for rivers, lakes, estuaries, and ground waters. The is to continue to protect and improve the quality of water in Wales, including Protected Areas.	It is understood that a HRA of this plan has not been undertaken**Error! Bookmark not defined.**. Based on a review of the proposed actions, these are broadly beneficial, are otherwise not outlined in detail or involve the implementation of activities that are already consented. For example, it references the delivery of capital funding programmes and catchment scale improvements through river restoration. As outlined above with respect to the RBD covering England, in-combination effects have not been identified.
SMP2[7]	A high level non-statutory policy document designed to assist coastal flood and erosion risk management planning across the Severn Estuary. The relevant SMP is Anchor Head to Lavernock Point SMP19.	The HRA[41] concludes that one of the main impacts arising from the implementation of the SMP2 will be losses of intertidal habitat (Atlantic salt meadows and intertidal mud and sandflats) arising from options that hold the existing line of defence. Related to this are potential impacts on bird population size, distribution and density. Potential in-combination effects are also identified in conjunction with other plans and projects, including Cardiff, Vale of Glamorgan, Monmouthshire and North Somerset Local Plans, with further assessment planned at as part of the Severn Estuary FRMS. As the SMP2 cannot be shown to have no adverse effects on the integrity of the sites, the next stage of HRA was required, specifically stage 3 alternative solutions and stage 4 IROPI and compensatory measures. Habitat creation under the National Habitat Creation Programme has been identified as the compensatory mechanism for coastal habitat losses through coastal squeeze. Whilst there are impacts on qualifying features of Severn Estuary designated sites associated with the SMP2, there are unlikely to be in-combination effects of the plan in conjunction with the SMP2, given the types and scale of effects associated with the plan (potential temporary impacts to spawning grounds for fish, disturbance and harm to fish and changes to water quality). The Cardiff LFRMS would not lead to the loss of equivalent habitats or associated impacts to bird populations, and indeed no permanent habitat loss is expected.

[38] Environment Agency, (2022); 'Severn River Basin District Flood Risk Management Plan 2021 to 2027.'

[39] Natural Resources Wales, (2022); 'Welsh part of the Severn River Basin Management Plan (2021-2027) Summary.'

[40] Environment Agency, (2022); 'Severn River Basin District Flood Risk Management Plan. Habitats Regulations Assessment. December 2022.'

Severn Estuary Flood Risk Management Strategy[42]	It is a long-term plan to manage tidal flood risks in the Severn Estuary. It covers the coast from Gloucester to Lavernock Point near Cardiff and from Gloucester to Hinkley Point in Somerset. The Strategy does not yet have any formal approval from Defra or Welsh Government. The three main objectives of the strategy are: • To define a 100-year plan of investment for flood defences by the Environment Agency, National Resources Wales and local authorities • To prioritise other flood risk management measures such as providing advice to utility companies to protect critical infrastructure, development control advice and flood warning investment • To decide where to create new intertidal habitats to compensate for losses of habitat caused by rising sea levels	There is no HRA available for review or documents with details of the strategy beyond that provided on the website. However, for the reasons set out relating to the SMP2, in-combination effects are unlikely given the types and scale of effects associated with the plan.

[41] Atkins on behalf of the Severn Estuary Coastal Group (2010); 'Severn Estuary Shoreline Management Plan Review. Appendix I: Part B – Habitats Regulations Assessment.'

[42] Severn Estuary Coastal Group, (2024); 'Severn Estuary Flood Risk Management Strategy.' Available at: https://severnestuarycoastalgroup.org.uk/severnestuaryfrms/

Strategic Environmental Assessment (SEA)

ARUP

Cardiff Council

Cardiff Council Local Flood Risk Management Strategy and Action Plan

Strategic Environmental Assessment

Reference: LFRMP-ARUP-XX-CC-SP-OE-000003

1.0 | 3 October 2024

Job number 300629-00

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Appendices

1. Introduction

1.1 Purpose of the Assessment

The Flood and Water Management Act[1] introduced in 2010 (FWMA 2010), places a duty on Cardiff Council (CC) to act as the Lead Local Flood Authority (LLFA) and to develop and adopt a Local Flood Risk Management Strategy (LFRMS). In 2014, CC published their first LFRMS[2] covering a 10-year period (2014-2024), which sets out their approach to managing local flood risk.

The production of a Flood Risk Management Plan (FRMP) is a requirement of the Flood Risk Regulations 2009[3] for LLFAs, although the Flood Risk Regulations 2009 legislation was revoked as part of the Retained EU Legislation Act on the 31 December 2023[4]. CC published a FRMP[5] in 2015, which takes forward the objectives and high-level actions of the 2014 LFRMS2 and sets out a more detailed plan for managing flooding from ordinary watercourses, surface runoff and groundwater over a six-year period starting from 2015. The FRMP aims to achieve the objectives set out in the Welsh Government's National Strategy for Flood and Coastal Erosion Risk Management (FCERM)[6], which provides the national framework for flood and coastal erosion risk management in Wales through four overarching objectives:

- Reducing the consequences for individuals, communities, businesses and the environment from flooding and coastal erosion;
- Raising awareness of and engaging people in the response to flood and coastal erosion risk;
- Providing an effective and sustained response to flood and coastal erosion events; and
- Prioritising investment in the most at risk communities.

CC are now developing a draft Flood Risk Management Strategy and Action Plan (FRMSAP) (hereafter, 'the draft Plan') which integrates a new LFRMS and FRMP into one document covering a 10-year period (2024-2034). The legislative context of the draft Plan is set out section 1.6. The draft Plan sets out:

- The roles and responsibilities for the management and mitigation of flood risk;
- The strategic objectives for managing local flood risk and how these align with the National Strategy for FCERM[5];
- The measures by which the strategic objectives (as above) will be met;
- A focused plan, detailing specific actions that will be required to meet the strategic objectives and measures (as above);
- The ways in which flood risk management activities will be funded and how activities will be prioritised; and

[1] Flood and Water Management Act 2010. Available at: https://www.legislation.gov.uk/ukpga/2010/29/contents

[2] Local Flood Risk Management Strategy. City of Cardiff Council. September 2014. Available at: https://www.cardiff.gov.uk/ENG/Your-Council/Strategies-plans-and-policies/Documents/Flood/Local%20Flood%20Risk%20Management%20Strategy.pdf

[4] Legislation.gov.UK. 2009 No. 3042 Environmental Protection. Available at: The Flood Risk Regulations 2009 (revoked) (legislation.gov.uk)

[5] Cardiff Flood Risk Management Plan. December 2015. Available at: https://www.caerdydd.gov.uk/ENG/resident/Community-safety/Flood-and-Coastal-Erosion-Risk-Management/Documents/Cardiff%20Flood%20Risk%20Management%20Plan.pdf

[6] The National Strategy for Flood and Coastal Erosion Risk Management in Wales. October 2020. Available at: https://www.gov.wales/sites/default/files/publications/2021-03/the-national-strategy-for-flood-and-coastal-erosion-risk-management-in-wales.pdf

- How progress in delivering the objectives, measures and actions set out in the draft Plan will be measured and monitored.

1.2 What is strategic environmental assessment?

Strategic Environment Assessment (SEA) is the term used to describe environmental assessment as applied to plans and programmes in accordance with the European Council Directive 2001/42/EC 'on the assessment of the effects of certain plans and programmes on the environment'. EC Directive 2001/42/EC (known as the SEA Directive) is enacted in England and Wales through the 'Environmental Assessment of Plans and Programmes Regulations' (SI 2004/1633) (SEA Regulations).

It is a legal requirement for responsible authorities to undertake an SEA of plans and programmes that are subject to preparation and/or adoption by an authority at a local, regional or national level and which are required by legislative, regulatory or administrative provisions. The Directive therefore applies to a variety of plans and programmes including the draft Plan.

The purpose of an SEA is to ensure that potential significant environmental effects that could occur as a result of an environmental plan or programme's implementation are identified and mitigated.

The objective of SEA, according to Article I of the SEA Directive, is 'to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans with a view to promoting sustainable development[7]. In order to do this, the SEA Directive requires plans and programmes to undergo an environmental assessment to determine the likely significant effects on topics such as biodiversity, climatic factors, human health, population, cultural heritage (including archaeology), landscape and water and the interrelationship between these factors.

1.3 The SEA Process

The SEA process is comprised of the following steps (Figure 1):

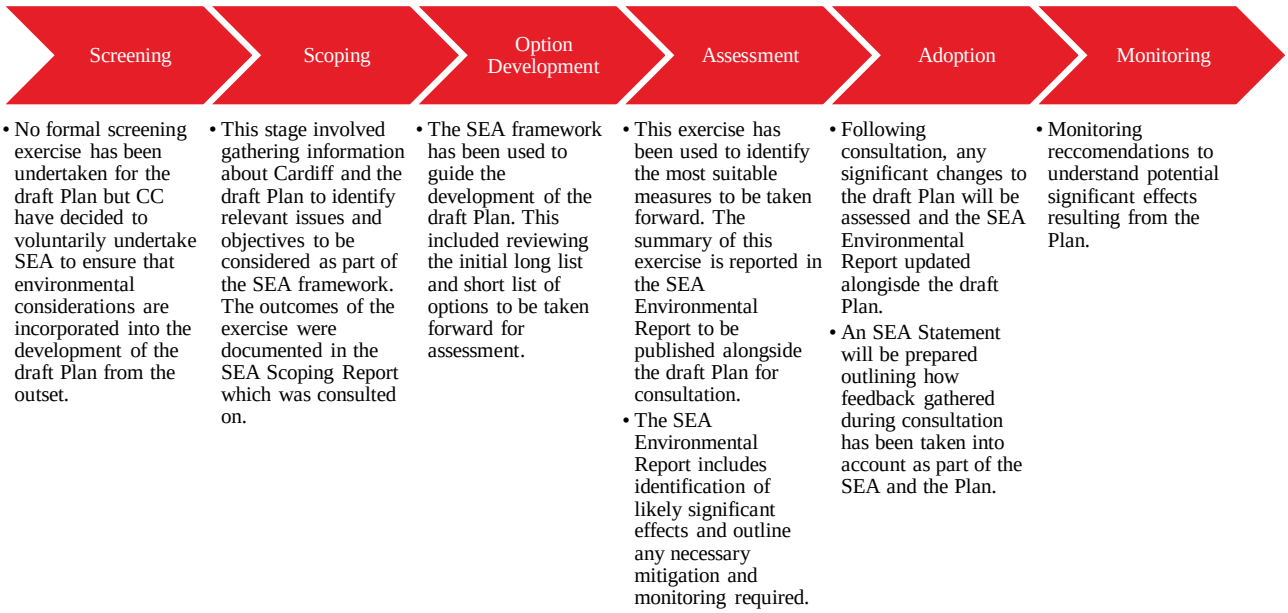

Figure 1 SEA Process steps

SEA is intended to inform decision-making and will 'test' systematically the performance of the draft Plan as a whole and its individual objectives and policies against SEA criteria. It should be noted that under planning and development legislation, certain projects taking place within the Plan area arising during implementation

[7] Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment. Official Journal L 197 ,21/07/2001 P. 0030 – 0037. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32001L0042&rid=1

of the draft Plan may require individual Environmental Impact Assessment (EIA). Where these projects are sufficiently progressed through the planning process, they have been excluded from the SEA.

The scoping stage of the process was carried out in June 2024 and the SEA Environmental Report is being submitted for consultation in 2024 alongside the draft Plan.

1.4 Meeting the Requirements of the SEA Directive

The SEA is focused on environmental effects and the methodology addresses a number of topic areas namely biodiversity, population, human health, fauna and flora, soil, water, air, climatic factors, material assets, cultural heritage and landscape and the interrelationship between these topics. Table 1 sets out where the specific SEA requirements have been addressed in this SEA Environmental report.

Table 1 Meeting the requirements of the SEA Directive

Requirements of the Directive	Where Covered in the Environmental Report
Preparation of an environmental report in which the likely significant effects on the environment of implementing the plan or programme, and reasonable alternatives taking into account the objectives and geographical scope of the plan or programme, are identified, described and evaluated. The information to be given is (Art. 5 and Annex I)	
a) An outline of the contents, main objectives of the plan or programme, and relationship with other relevant plans and programmes;	An outline of the contents and main objectives of the draft Plan are set out in Figure 3 in Section 1.6: Background to the draft Plan, and detailed in 3.1.1: SEA Objectives. References to other plans and programmes are included within Appendix A and summarised in Table 2 Overview of themes identified from plans, programmes and environmental objectives.
b) The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme;	The relevant aspects of the current state of the environment and the likely evolution thereof are set out in Section 1.7 and Appendix B.
c) The environmental characteristics of areas likely to be significantly affected;	The environmental characteristics of areas likely to be significantly affected are included in Appendix B.
d) Any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC;	Existing environmental problems are identified in Table 3 Potential Environmental Effects
e) The environmental protection objectives, established at international, community or national level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation;	The environmental protection objectives established at international, community or national levels have been outlined in Appendix A.
f) The likely significant effects on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors. (Footnote: These effects should include secondary, cumulative, synergistic, short, medium and long-term permanent and temporary, positive and negative effects);	The likely significant effects on the environment have been included in Table 3 Potential Environmental Effects.
g) The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme;	Recommendations for mitigating predicted adverse effects have been made where necessary to improve the environmental robustness of the draft Plan. Any appropriate mitigation measures identified during the assessment are provided in Section 5.1.
h) An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information;	Rationale for selecting alternatives is set out in Section 3.2, and the assessment methodology is included in Section 3.4, and Figure 1 SEA Process steps sets out steps for undertaking the SEA.

Requirements of the Directive	Where Covered in the Environmental Report
i) a description of measures envisaged concerning monitoring in accordance with Article 10;	Measures regarding monitoring are set out in Section 5 Mitigation and Monitoring.
j) a non-technical summary of the information provided under the above headings	A summary of findings from the SEA is included in Section 4 Summary of Findings.

1.5 Habitats Regulations Assessment (HRA)

The EU Habitats (92/43/EEC) and Birds (2009/147/EEC) Directives aim to protect European birds and species and the habitats that support them. In the UK, the Directives are implemented through the Conservation of Habitats and Species Regulations 2010, as amended. These are known as the Habitats Regulations[8].

The legislation requires 'competent authorities' to undertake an 'appropriate assessment' of plans, projects and strategies that may have a significant effect on the site, if those plans, projects or strategies are not directly concerned with the management of the protected sites themselves. The process that includes the 'appropriate assessment' is known as a Habitats Regulations Assessment (HRA) Appropriate Assessment.

Paragraphs 109, 113, 118 and 119 of the National Planning Policy Framework (NPPF) are relevant to HRAs. Specifically, paragraph 118 states that any 'sites identified, or required as compensatory measures for adverse effects on European sites Special Protection Areas (SPA) and Special Areas of Conservation (SAC), potential SPAs, possible SACs and listed or proposed Ramsar sites should be given the same protection as European sites'[9]. The HRA of the draft Plan has been completed by Arup on behalf of CC as a separate exercise to this SEA.

A total of 3 European sites have been identified for inclusion within the HRA Appropriate Assessment based on their geographic location (within Cardiff or those within the influence of the plan in terms of possible significant effects through a known impact pathway) and their potential to be impacted by the draft Plan.

The results of the HRA screening exercise indicate that two measures: Measure TAF4, Measure TAF5 (details relating to these measures is included in Table 8) were considered to have the potential to lead to likely significant effects to a European site. No in-combination effects were anticipated from the other plans and projects.

The HRA Appropriate Assessment concluded that likely significant effects could not be ruled out with respect to the Severn Estuary SAC, SPA and Ramsar site due to habitat loss and degradation, disturbance and harm and changes to water quality. The draft plan is unlikely to have an adverse impact on the integrity of the Severn Estuary designated sites providing that appropriate mitigation measures are adopted and implemented during construction, including the careful timing of works, supervision by qualified personnel, pollution prevention protocols and strict biosecurity measures. These mitigation measures are considered to be sufficient to ensure that the plan would not hinder European sites from achieving their conservation objectives.

1.6 Background to the Cardiff LFRMP

The Welsh Government's National Strategy for FCERM[5] is a strategy required under the Flood and Water Management Act 2010[1] and sets the framework for managing flood and coastal erosion risks across Wales; every flood risk management plan in Wales must align with the overarching National FCERM Strategy objectives. The draft Plan has been developed to align with the overarching objectives, measures and related policies and legislation that are set out in the National FCERM Strategy.

The area covered by the draft Plan is shown in Figure 2 and encompasses the administrative boundary of CC, which covers an area of approximately 158m^2 and contains a population of around 362,000[10], hereafter referred

[8] Her Majesty's Stationary Office (HMSO), (2017); 'The Conservation of Habitats and Species Regulations.' Available at: The Conservation of Habitats and Species Regulations 2017 (nationalgrid.com)

[9] Ministry of Housing, Communities and Local Government. National Planning Policy Framework. Available at: National Planning Policy Framework - Guidance - GOV.UK (www.gov.uk)

[10] Office for National Statistics (2021) Census 2021. Available online at: https://www.ons.gov.uk/visualisations/censusareachanges/W06000015/

to as the ‘Plan area’. The Plan area falls within the Ely, Taff and Rhymney main river catchments. Figure 2 shows the location of these rivers and their catchments within the boundary of Cardiff.

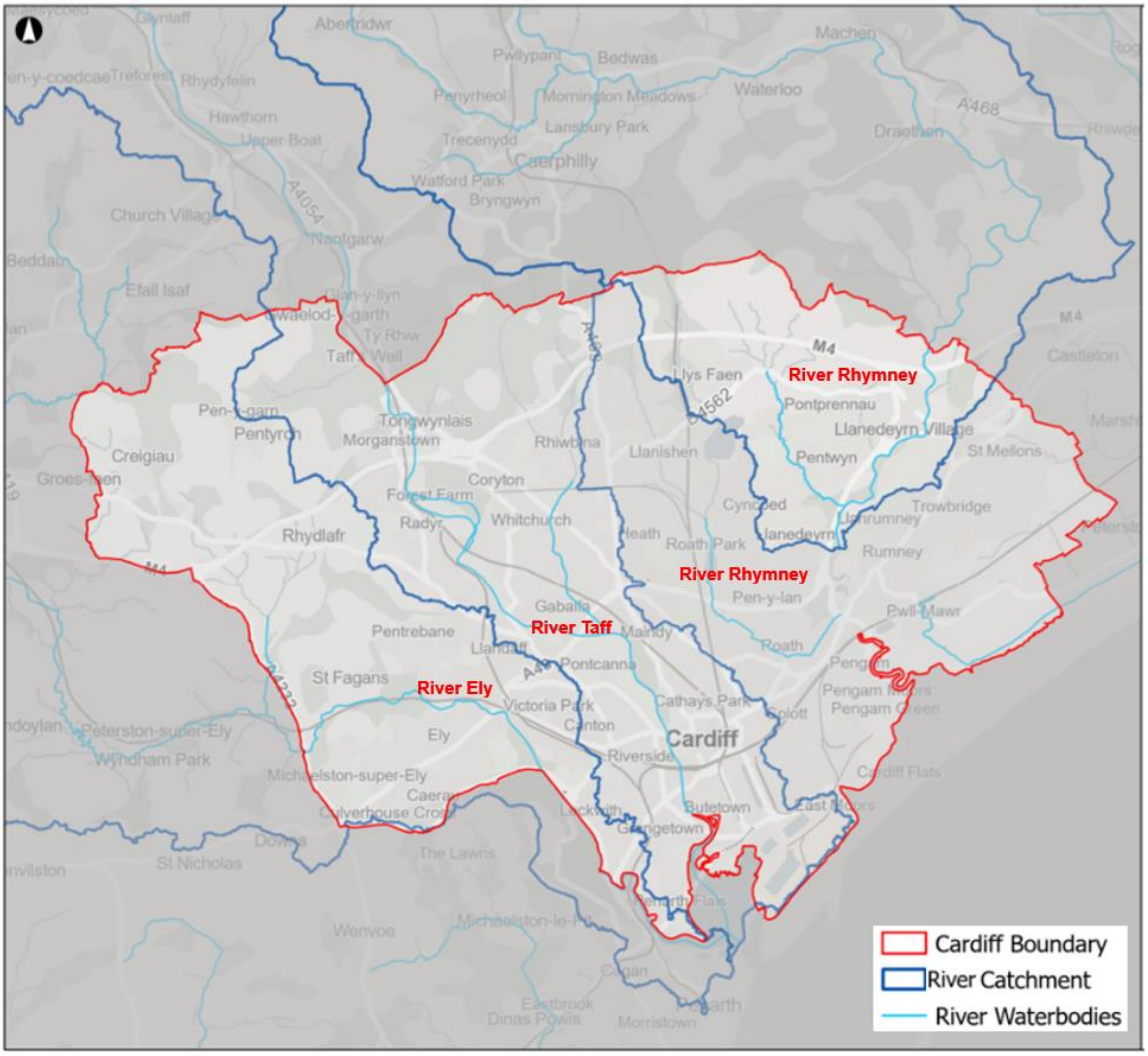

Figure 2 Cardiff Catchments Overview

The draft Plan identifies the strategic objectives for managing local flood risk (hereafter ‘the Objectives’), the measures by which these Objectives will be met (hereafter ‘the Measures’) and the specific actions that will be delivered to achieve the Objectives and Measures (hereafter ‘the Actions’). Full definitions for Objectives, Measures and Actions are shown in Figure 3 below.

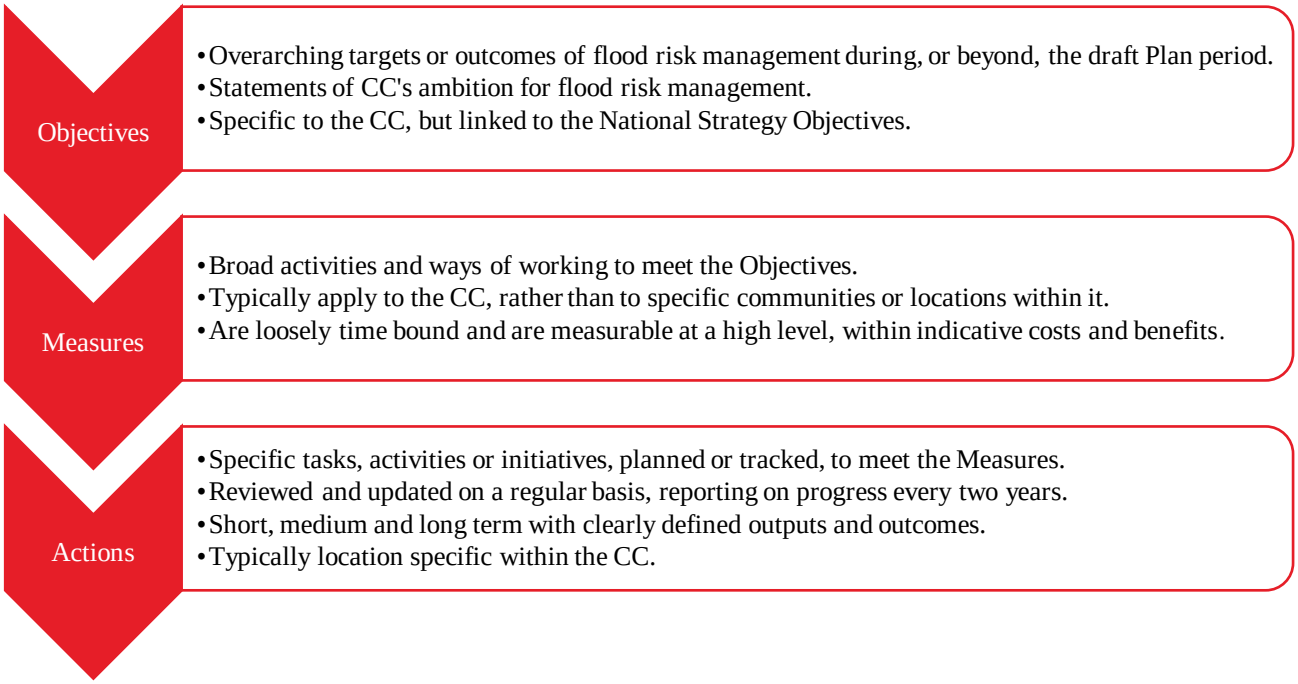

Figure 3 Definitions for Objectives, Measures and Actions

The draft Plan describes roles and responsibilities for the management of flood risk. In summary, strategic oversight is afforded to the Welsh Government and Natural Resources Wales (NRW). At a more local level, there are Risk Management Authorities (RMAs) who are required to fulfil statutory duties as defined in the FWMA 2010 and are responsible for the mitigation of different sources of flood risk, these RMAs are outlined in Figure 4 below.

Main River - NRW	• Flooding from watercourses designated as 'Main River' on NRW's Mapping.
Ordinary Watercourse - Cardiff Council NRW for Drainage Districts	• Flooding from all other watercourses not designated as 'Main River'.
Surface Water - Cardiff Council	• Flooding caused by rainfall where the capacity of soil / drainage system is exceeded.
Groundwater - Cardiff Council	• Flooding caused by water rising from underground and entering underground structures or running across the land.
Highway Flooding - Cardiff Council	• Flooding caused by the inability of highway drainage system to convey surface water.
Coastal Flooding - NRW	• Flooding from the sea.
Reservoirs - Reservoir owners	• Flooding from above ground water storage.
Public Water and Sewerage- Dŵr Cymru Welsh Water	• Flooding caused by water rising from underground and entering underground structures or running across the land or from rainfall where the capacity of the drainage system is exceeded.
Highway flooding on trunk roads- Welsh Government	• Flooding caused by rainfall where the capacity of drainage system is exceeded

Figure 4 RMAs in Cardiff

The Flood and Water Management Act that was introduced in 2010 (FWMA 2010), places a duty on CC to act as the Lead Local Flood Authority (LLFA) responsible for managing local flood risk resulting from ordinary watercourses, surface water and groundwater. As a result of that, CC has a number of statutory duties including:

- Developing, adapting and maintaining a strategy for local flood risk management;
- Complying with the National FCERM Strategy;
- Cooperating with RMA's and other authorities, including the sharing of data;
- Investigating flooding when it is deemed appropriate or necessary; and
- Maintaining a register of structures that are likely affect flood risk.

CC has the responsibility to respond to flood incidents which may arise from reservoir assets within their unitary boundary, which should be set out in a reservoir flood plan. A reservoir flood plan is not a statutory requirement

Schedule 3 of FWMA 2010 enacted in January 2019, designated CC as the Sustainable Drainage System (SuDS) approval body for Cardiff. Accordingly, CC have a duty to ensure the effective management of surface water within new developments ensuring they are built in line with the mandatory National Standards for SuDS.

Further details relating to the content of the draft Plan are included within Section 3.5.

1.7 Why is this needed and what will it achieve?

According to latest NRW figures, 12,000 residential properties in Cardiff are at risk of tidal flooding, 17,000 are at risk of fluvial flooding and 7,000 are at risk of surface water flooding, with a total of approximately 33,000 properties predicted to be threatened by 2050[11].The FCERM National Strategy explains that as the climate changes, we can expect those risks to increase, with more frequent and severe floods, rising sea levels and faster rates of erosion of the coast.

Flooding can derive from various sources, including rivers, streams, the sea and more commonly in Cardiff from blocked drains or old sewers that cannot cope with the volumes of water from heavy rainfall. Although Cardiff has not had many significant flooding incidents, an increasing number of flooding issues occurring in periods of heavy rain have been experienced[12]. The Objectives, Measures and Actions identified in the draft Plan are intended to help reduce the risk of flooding locally and minimise impacts that any flood event could have on the local communities, the environment, and the economy.

CC declared a climate emergency in March 2019, acknowledging their role and responsibility for the protection and enhancement of the environment, and committed to working towards becoming a carbon neutral organisation and city by 2030[13]. The draft Plan is being developed with a view of incorporating and responding to impacts of climate change on long term flood risk.

[11] Cardiff PSB. Cardiff Wellbeing Plan 2023-2028. Available at: Cardiff Local Well-being Plan 2023 to 2028

[12] City of Cardiff Council. Local Floor Risk Management Strategy Non Technical Summary, 2014. Available at: Local Flood Risk Management Strategy (cardiff.gov.uk)

[13] One Planet Cardiff. Our vision for a Carbon Neutral City by 2030. Available at: https://www.oneplanetcardiff.co.uk/wp-content/uploads/OPC%20vision%20document.pdf

2. Stage A: Scoping the assessment

2.1 Introduction

This stage of the SEA process involves gathering evidence to help set the context and objectives, establish the environmental baseline, and decide on the scope of the SEA. The evidence collected during the baseline review has been used to develop a set of suitable objectives against which the strategic environmental effects of the draft Plan can be assessed. The following sections provide a summary of the policy context, the relevant aspects of the current state of the environment and any existing environmental problems as required in the SEA Directive. The SEA Scoping report was consulted on in June 2024 for a 5-week statutory consultation period. The SEA Scoping Opinion was received in August 2024.

2.2 A1: Review of Plans, Policies and Programmes

A review of pertinent international, national and regional plans, programmes and environmental objectives relevant to the draft Plan is provided in Appendix A and includes an overview of these plans, policies and programmes and their relevance to the draft Plan. This is not an exhaustive list and has been updated following statutory consultation with Cadw and NRW on the SEA Scoping Report. A summary of key environmental themes identified through the review is provided below in Table 2 and include the scale at which they are most likely to apply, (i.e. local or national).

Table 2 Overview of themes identified from plans, programmes and environmental objectives

SEA topic	Theme
Air quality	Strive to achieve the target values specified within the Air Quality Standards (Wales) Regulations 2010 (national) Control levels of pollution to protect human health and the environment (local and national) Reduce and monitor the emissions produced from transport, homes, farming and industry (local and national) Utilise nature-based solutions as method of improving air quality (local)
Biodiversity	Ensure the conservation of wild flora and fauna species and their habitats (national and local) Improve conditions for pollinators with the aim of halting and reversing their decline (national) Deliver nature-based solutions and green infrastructure (national and local) Address the threats posed by invasive non-native species (national) Align responses to the climate emergency with the biodiversity crisis (national and local) Improve the condition of the Protected Sites Network (national) Protect and enhance ecosystem resilience (national and local)
Climate and carbon	Link ecosystem resilience and climate change adaptation and mitigation (national and local) Increase renewable energy and resource efficiency (local) Reduce greenhouse gas emissions (national) Support the adaption of business infrastructure, protecting buildings and their surroundings, the natural environment, public health and communities to the effects of climate change (local)

SEA topic	Theme
Cultural heritage	Protect, preserve and enhance historic assets and the wider historic environment (local, national and international) Ensure that development affecting the historic environment is in keeping with and enhances the historic landscape and maintains traditions of the built environment (local) Promote and protect Welsh language, heritage and culture (national)
Ground conditions (soils and geology)	Restore degraded land (International) Plant trees and woodlands to contribute to water and soil management at a local and catchment level (local, regional, national) Protect and enhance local geological resources (local) Use soil resources in a sustainable manner in all new development, and maintain standards for soil quality at a high level (national)
Infrastructure and transport (material assets)	Improve connectivity within Wales (national) Achieve a modal shift towards more sustainable forms of transport (national) Improve access to services and facilities, particularly by public transport, walking and cycling (national and local) Reduce the impact of the transport system on the natural and built environment (local) Make the transport system more robust with respect to the consequences of climate change (national and local) Increase public awareness of the consequences of their travel choices on climate, the environment and health (local)
Land use and landscape	Ensure that all future development will protect and enhance the character of the Landscape (local) Ensure that all development affecting the historic environment enhances the historic landscape and traditions of the built environment whilst also taking appropriate account of the requirements for sustainable design (local) Encourage development on previously developed land in preference to the development of Greenfield land (national and local) Ensure protection, provision and improving open space (local and national)
Population and human health (communities)	Develop communities that are well connected, inclusive and healthy places that everyone can be a part of (national) Development in town and city centres should be designed to support people's health and wellbeing (national and local) Promote and protect the Welsh language (national, regional, local) Support job opportunities and community services in local areas to help attract and retain people (regional) Deliver economic growth driven by innovation, skills, connectivity and more productive jobs (local) Enhance decision making processes and outcomes for those who are socio-economically disadvantaged (national) Improve access to healthcare, education, shopping, visitor attractions and leisure facilities (local)

SEA topic	Theme
	Encourage healthy lifestyles (national and local)
Resources and waste	Ensure that waste and pollutants are managed and disposed of correctly and do not cause harm to the environment (national) Work to limit damage to species and habitats, water and risks to human health from contaminated of land (national) Limit the environmental impact of mineral extraction (local) Encourage efficient and appropriate use of minerals and the re-use and recycling of suitable materials (regional) Promote the waste hierarchy of reduce, reuse, and recycle (local) Safeguard mineral resources from sterilisation (local)
Water environment	Protect and enhance the quality of the water environment (national and regional) Prevent the deterioration in the status of aquatic ecosystems and improve the ecological condition of waters (national, regional and local) Conserve habitats and species that depend directly on water (national) Support the delivery of WFD targets (local and national) Manage and protect groundwater and drinking water supplies (national) Promote sustainable use of water as a natural resource (national) Improve the resilience of communities and infrastructure to flood risk (national) Reduce or phase out the release of individual pollutants or groups of pollutants that present a significant threat to groundwater and the aquatic environment (national) Contribute to mitigating the effects of floods and droughts (local) Reduce flood risk within the catchment, focusing on high risk areas identified within the Taff and Ely Catchment Flood Management Plan.

2.3 A2: Environmental Context (Establishing the Baseline and Future Baseline Environment)

This task provided an evidence base for identifying environmental issues, predicting effects, and monitoring; and assisted in the subsequent development of SEA objectives. This task was desk-based, largely focusing on publicly accessible datasets together with data held by CC. Consideration was given to the baseline data gathered during the scoping process for the draft Plan as presented in the SEA Scoping Report, with relevant data updated following statutory consultation responses from both Cadw and NRW included within Appendix C.

2.4 A3 Identifying Environmental Problems

Any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas likely to lead to potential environmental effects, are set out below within Table 3 Potential Environmental Effects.

Table 3 Potential Environmental Effects

SEA Topic	Topics Scoped into the SEA	Potential Environmental Effects
Biodiversity	Yes	There is potential for designated sites, including SAC, SPA, Ramsar and SSSIs, are located within and in the vicinity of the draft Plan area to be impacted by the potential river interventions, because of potential habitat loss and degradation. There is a potential for protected habitats and species to be impacted by the river interventions which could lead to habitat loss/alteration, which could have an effect on diversity, extent, conditions and connectivity of all ecosystems. There is a potential that river interventions and drainage measures may lead to a change in water quality (including the sedimentation and nutrient runoff) and indirect disturbance to the migration patterns of species in the Severn Estuary. There is potential for inadvertent spread of invasive species due to works associated with draft Plan interventions. There is a potential for biodiversity net gain in line with the Green Infrastructure Assessment and Resilient Ecological Networks (Nature Networks).
Climate and carbon	Yes	There is potential that the implementation of conventional flood resilience solutions will increase carbon emissions as they rely heavily on carbon intensive practices. There is potential that the severity and frequency of extreme weather event including heat waves, heavy rainfall, flooding and droughts is likely to increase. However it is acknowledged that although CO_2 emissions in Cardiff have shown signs of reducing in the past few years, the climate change impacts across Wales are projected to continue and intensify.
Cultural heritage	Yes	There is potential for Registered Historic Landscape Areas, Listed buildings, Conservation Areas, Scheduled Ancient Monuments, Historic Parks and Gardens located in the vicinity of the flood risk areas in the Plan to be impacted directly or indirectly by flooding or measures to alleviate flooding. There is potential for the severity and frequency of extreme weather events to harm heritage assets.
Ground conditions	Yes	There is potential for historic landfill sites located in the Plan area to restrict the measures considered within the draft Plan. There is potential for the placement of certain interventions near groundwater abstraction points to negatively impact storage or recharge of these resources. There is potential for river interventions which would intercept recharge or take water (groundwater abstraction), to negatively impact groundwater storage.
Land use and landscape	Yes	There is potential that proposed river interventions may alter the visual appearance of the landscape, it will also impact the perceived identity and character of the landscape for local communities. There is a potential to utilise nature networks when creating green infrastructure to improve resilience and biodiversity.
Population and human health	Yes	There is potential that in the absence of the draft Plan measures there is potential for both physical danger and mental health impacts associated with flooding. There is potential for the measures set out within the draft Plan to provide job opportunities and training for local communities (particularly from economically deprived areas). There is a potential for improved environmental amenity as a result of increased green infrastructure. The most deprived areas are more likely to be vulnerable to the climate risks of increased flooding, heatwaves, and have a reduced capacity to cope/recover
Resources and waste	Yes	There is potential for contamination relating to the materials associated with the proposed measures located either on or in proximity to safeguarding areas.

SEA Topic	Topics Scoped into the SEA	Potential Environmental Effects
		There is potential for a shortage of construction material availability given the number of measures proposed.
Water environment	Yes	There is a potential for flooding across the Cardiff area with many areas of the draft Plan area considered at risk of a high probability of flooding (Flood Zone 3). There is potential for flooding from surface runoff due to inadequate drainage systems. There is potential for climate change to increase the severity and frequency of flood events There is potential for climate change (and the resultant increased frequency of drought events) to lead to a decrease in water availability There is a potential for a decrease in water availability as a result of population growth. There is a potential that river interventions and drainage measures may lead to a change in water quality
Transport	Yes	There is potential that damage to transport infrastructure caused by flooding to be reduced. There is potential that disruption caused by flooding to be reduced.
Air quality	No	There is a potential for air quality improvements as a result of SuDS and green infrastructure.

2.5 A4: Developing the SEA Framework

The SEA Framework is presented within Section 3.1

2.6 Task A5: Consulting on the Scope of the SEA

Views of the statutory consultation bodies, NRW and Cadw were sought on the proposed scope and detail of the SEA Environmental Report. A SEA Scoping Report was submitted in June 2024 to support this process, the consultation results received in August 2024, comments in response to these are provided within Appendix C.

3. Assessment of the Draft Local Flood Risk Management Strategy

3.1 SEA Framework

The purpose of an SEA Framework is to provide a method for describing, analysing and comparing the environmental and sustainability effects of plans and policies. The SEA Assessment Framework is underpinned by a series of SEA objectives which state what is intended, specifying a desired direction of environmental change. The draft Plan's performance against objectives is normally measured by using indicators.

3.1.1 SEA Objectives

The SEA comprises a review of the short-list of draft Plan measures. The short-list was narrowed down from a longer list as part of preliminary measures review, led by CC, based on an initial review of description, benefits and the type of flood management.

The draft Plan's measures appraisal uses the SEA objectives and guiding questions, which were agreed at the SEA Scoping Stage. To inform the assessment and provide justification for the scoring against each objective, a range of criteria has been developed, as set out in Table 1.

Publicly available information, including spatial data and aerial imagery, has been used, alongside professional judgement where necessary. Where required, a rationale for the scoring and any recommended mitigation / considerations has been provided as part of the appraisal.

A scoring system has been used in the appraisal, with the rationale for the scoring against the criteria set out set out in Section 3.4. Where information is insufficient at the current stage in the plan making process this has been identified.

Table 4 SEA Objectives

	SEA Objective	SEA Topic	SEA Criteria
1	Protect and enhance designated sites and priority species / habitats	Flooding	Would the Plan cause harm or any deterioration in the condition of any designated sites, valuable habitat or to protected species? Would the Plan contribute to the enhancement in condition or expansion of any designated sites and/or priority species or habitats i.e. through reducing flooding and drought frequency? Would the Plan increase the risk of spreading invasive species?
2	Improve access to and enhance natural green and blue space	Biodiversity Population and Health	Would the Plan improve the proportion and quality of green and blue space that is accessible to residents? Would the Plan create safe and inclusive nature-based recreation environment?
3	Contribute to the restoration and recovery of biodiversity through delivering net benefits for biodiversity	Biodiversity	Would the Plan deliver net benefits for biodiversity? Would the Plan contribute to ecosystem resilience (e.g. by contributing to the attributes of diversity, extent, condition and connectivity which strengthen ecosystem resilience)
4	Support national greenhouse gas emission reduction targets	Climate and Carbon	Would the Plan help meet Wales's target to have a 'net zero' public sector by 2030 (and a net zero Wales by 2050)?
5	Accommodate for future climate change predictions	Climate and Carbon Population and Health	Would the Plan include measures to reduce the impacts to communities from hotter / drier summers and wetter winters increasing resilience to climate change? Would the Plan reduce the impacts of extreme flood and drought events on communities and businesses?

	SEA Objective	SEA Topic	SEA Criteria
6	Protect and enhance the historic environment	Cultural Heritage	Would the Plan cause direct or indirect harm to designated heritage assets or their setting? Does the Plan provide measures to avoid and/or mitigate harm to non-designated heritage assets? Would the Plan reduce the impact of drought or flooding on heritage assets?
7	Protect and enhance groundwater / surface water resources	Ground conditions Water Environment	Would the Plan have a negative impact on groundwater/ surface water resources used for water abstraction? Would the Plan have a negative impact on the quality of groundwater resources/ surface water? Would the Plan help improve storage and recharge of groundwater resources?
8	Protect infrastructure from damage from flooding	Infrastructure Transport	Would the Plan reduce damage to infrastructure (including transport) caused by flooding? Would the Plan reduce pressure on water treatment works? Would the Plan help protect and increase resilience of flood defence infrastructure?
9	Preserve and enhance the landscape	Land use and landscape	Would the Plan result in the enhancement to the condition and character of any protected or designated landscapes?
10	Improve soil health	Land use and landscape	Would the Plan lead to improvements in soil health? Would the Plan increase the opportunity of soil carbon stores?
11	Support sustainable agricultural practices to reduce flood risk	Land use and landscape	Would the Plan encourage agricultural practices that support flood resilience and introduce regenerative agriculture land management? Would the Plan contribute to the sustainable management of land in CC care?
12	Connection to nature	Land use and landscape Population and Health	Would the Plan improve public access to green and blue spaces? Would the Plan foster a sense of ownership and guardianship of the landscape through community participation
13	Target measures to support those who are vulnerable and most at risk to flooding	Population and Health	Would the Plan reduce the impact of flooding on those communities that are most at risk and/or vulnerable? Would the Plan increase awareness of flood risk on those communities that are most at risk and/or vulnerable?
14	Contribute to reduced inequalities	Population and Health	Would the Plan help improve environmental conditions and quality of life for the most deprived communities? Would the Plan support the needs of members of society who have protected characteristics?
15	Reduce risk of flooding from rivers and surface water	Water environment Population and Health	Would the Plan help reduce the area of land at high risk of flooding from rivers? Would the Plan help reduce the area of land at high risk of flooding from surface water? Would the Plan help release land available for development (as a result of reduced flood risk)? Would the Plan help reduce flood damage to existing properties and infrastructure? Would there be improvements in mental health (reduced anxiety) related to flooding?

	SEA Objective	SEA Topic	SEA Criteria
16	Improve water resources management	Water Environment Population and Health Infrastructure	Would the Plan help to reduce the impact of low flows on the environment, people and industry?
17	Improve the health of water bodies	Water environment Biodiversity	Would the Plan lead to improvements in the ecological and chemical quality element statuses of water bodies? Would the Plan increase the proportion of water bodies meeting 'good' ecological status? Would the Plan help to achieve the WFD water body measures? Would the plan create opportunities for maintaining, enhancing and restoring floodplains and hydrogeological systems?
18	Contribute to increased community participation	Population and Health	Would the Plan create opportunities for community participation and/or ownership of community projects?

3.2 Developing Strategic Alternatives

The SEA Directive requires that consideration should be given to "reasonable alternatives taking into account the objectives and geographical scope of the plan or programme". The SEA Regulations require reasonable alternatives to the preferred option for achieving the draft Plan objectives to be assessed. They identify that the SEA Environmental Report (Environmental Report) must state ''the reasons for choosing the plan or programme as adopted; in light of the other reasonable alternatives dealt with....'' Article 16(4). If alternatives are then assessed, the effects of each can be taken into account so that the potential adverse effects of the plan can be avoided, and beneficial aspects identified and enhanced.

Despite the above, alternatives should be limited to those that are realistic and achievable. As the draft Plan will be brought forward in accordance with both national policies generally and more specifically in line with the strategic priorities identified within the Cardiff, there is limited scope for alternative options at a strategic level. A 'Do Nothing' alternative has therefore not been considered as a realistic alternative as it will not result in the draft Plan achieving the key priorities of the National FCERM Strategy.

As a result of the above, the identification and appraisal of strategic alternatives (Task B2) has not been undertaken in this SEA.

3.3 SEA Objectives Compatibility Assessment

The internal compatibility of the SEA Objectives has been tested to ensure that any tensions between the SEA Objectives are resolved and that there are no contradictions between SEA Objectives. It is also important to ensure that the objectives of the draft Plan are in accordance with the defined SEA objectives. Therefore, the compatibility of the draft Plan objectives with the SEA objectives has been tested via a further matrix-based approach designed to identify potential synergies, along with potential conflicts. This comprises Task B1 of the SEA Process.

These compatibility matrices are presented in Table 5 and Table 6respectively. Both tables indicate that there is no incompatibility either within the SEA Objectives themselves and between the SEA Objectives and the draft Plan objectives. There are therefore no tensions between the SEA Objectives, nor are there any conflicts with the SEA Objectives and the draft Plan objectives.

Table 5 SEA Objective and Draft Plan Compatibility Matrix

SEA Objective 1							✓		
SEA Objective 2			✓				✓		
SEA Objective 3							✓		
SEA Objective 4	✓			✓	✓				
SEA Objective 5	✓								
SEA Objective 6	✓								
SEA Objective 7			✓				✓		
SEA Objective 8	✓	✓	✓						
SEA Objective 9							✓		
SEA Objective 10							✓		
SEA Objective 11				✓	✓				
SEA Objective 12		✓					✓		
SEA Objective 13	✓	✓						✓	
SEA Objective 14	✓	✓				✓			
SEA Objective 15	✓	✓		✓				✓	
SEA Objective 16	✓		✓	✓				✓	
SEA Objective 17			✓				✓		
SEA Objective 18	✓	✓							✓
SEA Objective / Draft Plan Objective	Draft Plan Objective 1 Reduce the risk and impact of flooding to communities, commercial enterprises, and critical infrastructure	Draft Plan Objective 2 Work with local communities to improve knowledge of flood risk and to improve community resilience	Draft Plan Objective 3 Improve Water Quality	Draft Plan Objective 4 Work and co-operate with internal departments	Draft Plan Objective 5 Work and co-operate with other RMA's such as DCWW and NRW	Draft Plan Objective 6 Ensure Capital and Revenue funding allocated effectively ensuring all environmental and socio – economic effects / benefits are considered	Draft Plan Objective 7 Enhance the Natural environment	Draft Plan Objective 8 Ensure sustainable and effective flood risk management through all aspects of development	Draft Plan Objective 9 Assist in the development of resource within the flood risk management industry

SEA Objectives

1. Protect and enhance designated sites and priority species / habitats
2. Improve access to and enhance natural green and blue space
3. Contribute to the restoration and recovery of biodiversity through delivering net benefits for biodiversity
4. Support national greenhouse gas emission reduction targets
5. Accommodate for future climate change predictions
6. Protect and enhance the historic environment
7. Protect and enhance groundwater / surface water resources
8. Protect infrastructure from damage from flooding
9. Preserve and enhance the landscape
10. Improve soil health
11. Support sustainable agricultural practices to reduce flood risk
12. Connection to nature
13. Target measures to support those who are vulnerable and most at risk to flooding
14. Contribute to reduced inequalities
15. Reduce risk of flooding from rivers and surface water
16. Improve water resources management

17. Improve the health of water bodies

18. Contribute to increased community participation

Table 6 Draft Plan Objectives Compatibility Matrix

Objective 1 Reduce the risk and impact of flooding to communities, commercial enterprises, and critical infrastructure									
Objective 2 Work with local communities to improve knowledge of flood risk and to improve community resilience	✓								
Objective 3 Improve Water Quality	-	✓							
Objective 4 Work and co-operate with internal departments	✓	✓	✓						
Objective 5 Work and co-operate with other RMA's such as DCWW and NRW	✓	✓	✓	✓					
Objective 6 Ensure Capital and Revenue funding allocated effectively ensuring all environmental and socio – economic effects / benefits are considered	✓	-	✓	✓	-				
Objective 7 Enhance the Natural environment	✓	✓	✓	✓	✓	✓			
Objective 8 Ensure sustainable and effective flood risk management through all aspects of development	✓	✓	-	✓	✓	✓	✓		
Objective 9 Assist in the development of resource within the flood risk management industry	-	-	-	✓	-	✓	-	-	
Draft Plan Objectives	Objective 1 Reduce the risk and impact of flooding to communities, commercial enterprises, and critical infrastructure	Objective 2 Work with local communities to improve knowledge of flood risk and to improve community resilience	Objective 3 Improve Water Quality	Objective 4 Work and co-operate with internal departments	Objective 5 Work and co-operate with other RMA's such as DCWW and NRW	Objective 6 Ensure Capital and Revenue funding allocated effectively ensuring all environmental and socio – economic effects / benefits are considered	Objective 7 Enhance the Natural environment	Objective 8 Ensure sustainable and effective flood risk management through all aspects of development	Objective 9 Assist in the development of resource within the flood risk management industry
Key									
✓ Compatible									
X Incompatible									
- No links									

3.4 Assessment Methodology

3.4.1 Assessing significance

The SEA objectives will be used to help guide the development of the draft Plan and will also be used to understand the potential environmental effects of the Plan once implemented. The draft Plan options have been assessed against the SEA objectives using the corresponding questions identified in Table 7. A score has been assigned to each objective using the criteria outlined in Table 7 depending on the type and level of effect that the draft Plan is likely to have on the objective. The scoring is presented in a matrix in the SEA Environmental Report alongside a commentary that will provide a justification and supporting evidence for the scoring in Table 12 Development, Regeneration and Policy Measures, Table 13 Prevention, Protection and Response Measures and Table 14 Community, Stakeholder and Collaboration Measures.

Table 7 SEA scoring criteria

Assessment Symbol	Definition
++	Likely significant positive effect
+	Likely minor positive effect
0	Likely negligible or no effect
-	Likely minor negative effect
--	Likely significant negative effect
+/-	Likely to be a mix of positive and negative effects

Publicly available information, including spatial data and aerial imagery, will be used, alongside professional judgement where necessary. Where required, a rationale for the scoring and any recommended mitigation / considerations will be provided as part of the appraisal.

The following timescales have been used to describe the estimated length of time it would take for the predicted environmental effects of the draft Plan to approach or reach stability:

- Short term (ST): less than 1 year
- Medium term (MT): 1-5 years
- Long term (LT): more than 5 years

3.5 The Draft LFRMS and Action Plan

A summary of the draft Plan is presented below with a number of Measures and Actions. Further details can be found in the draft Plan to which this SEA Environmental Report is appended.

3.5.1 Measures

Below are the measures included under the draft Plan strategic objectives for the period 2024 – 2034.

Table 8 LFRMS Measures (extract from the draft Plan)

Reference	Measure	Description of measure
1	Ensure Climate change projections are included in all aspects of development and flood risk management	The LLFA will ensure the impacts of climate change are included in all aspects of flood risk management and development. An uplift factor of 40% will be included in all designs, modelling and assessments of surface water drainage systems, Sustainable drainage systems and flood alleviation schemes.
2	Consultee to the planning authority and building control	The LLFA will assist the LPA in ensuring that the flood risk of existing communities is not exacerbated by new development.

Reference	Measure	Description of measure
		The LLFA will also assist the LPA in ensuring all local, regional and national flood risk policies and guidance (such as TAN 15 and the LDP) are adhered to in regard to any development.
3	SuDS Approval Body (SAB)	The enacting of Schedule 3 of FWMA 2010 by The Welsh Government on the 7th January 2019 appoints CC as the SuDS Approval Body (SAB). Schedule 3 assigns several statutory responsibilities to CC including the assessment and adoption of drainage designs and related enforcement powers. CC also have the ability to adopt non mandatory drainage systems which could include those only serving one property or systems approved and construction before the implementation of Schedule 3.
4	Local Flood Risk Strategy	Prepare and adopt a strategy for the management of flood risk from local sources.
5	Surface Water Strategy	CC intends to develop a specific Surface Water Management Strategy in line with Section 8 of Tan 15.
6	Ensure Compliance with strategic policies	This strategy will ensure all decisions regarding the management of local flood risk comply with all local and national strategic policies.
7	Review and update Culverting Policy	At present CC culverting policy only allows the culverting of a watercourse for access and amenity purposes. The updated culverting policy will make CC position on culverting clearer and encourage the “daylighting” (removing of culverts) of watercourses.
8	Flood Risk Asset Register	Section 21 of FWMA 2010 places a statutory duty on CC to maintain a register of flood risk assets such as defences and debris screens etc.
9	Land Drainage Act 1991 duties	The LDA 1991 places statutory duties on CC as the LLFA, including permitting and enforcement powers.
10	Assist in the development of the SFCA	A strategic Flood Consequences Assessment (SFCA) is required to provide evidence to inform policies and site selection for Strategic and Local Development Plans. As sources of flood risk are not bound by authority boundaries, SFCA’s are often undertaken on a regional level by the associated LPA’s.
11	SuDS guidance	Develop a guidance for developers, residents and local groups to ensure effective design, management and maintenance.
12	OWC guidance	Develop a Guidance for developers and riparian owners for the management and maintenance of ordinary watercourses.
13	Response to flooding	CC response to flood events both during and after the event
14	Investigate all flooding incidents	CC will investigate all reported flood incidents impacting any flooding receptor. Should 20 or more properties suffer internal flooding from a single source then CC will undertake and write a Section 19 (FWMA 2010) report and publish on our website.
15	Flood alleviation Scheme development	There is a need for a long-term pipeline of flood alleviation schemes (FAS) to mitigate flood risk from local sources across the city. The national flood risk strategy provides guidance on how the draft Plan’s investment allocation should be utilised and is supported by recent Business Case Guidance. This guidance utilises the use of the 5-business case model within FAS development, as adopted by The Welsh Government and HM Treasury.

Reference	Measure	Description of measure
		CC will deliver FAS from the long-term pipeline in line with the business case guidance utilising the following projects: Strategic Outline Business Case (SOC) Business Justification Case (BJC) or Outline Business Case (OBC) Full Business Case (FBC) / Detailed Design Decisions on locations for possible FAS will be determined through a number of factors including current flood risk, CARR, climate change projections and historical flood incidents.
16	Critical Culvert Maintenance and Telemetry	CC has a number of critical culvert assets as described in Section 4.2.3. These assets have a CCTV camera and level logger that provides up to date water levels and images that inform CC's response to flood events and inclement weather. Improvements to the ongoing maintenance of these assets is critical to the mitigation of flood risk whilst ensuring the longevity of the assets.
17	Internal staff training	The LLFA will provide training to CC call centre staff (C2C) and other internal departments to ensure effective advice is given to someone reporting flooding. Training will be provided to other CC departments, such as Waste Management, to ensure all CC resources are utilised, as far as is reasonably practicable, in any response to flooding, as per Measure 13.
18	Consultee to CC's Resilience Management Unit	CC Resilience Unit has a statutory duty under the Civil Contingencies Act 2004 to adopt and maintain plans to respond to flooding emergencies. The LLFA will assist the Resilience Unit in the update of these plans and work with them during a major flooding event. Effective response plans will involve the community throughout the process, ensuring community engagement pre, during and post flood event.
19	Sharing of Surface water modelling	The LLFA will share any surface water modelling undertaken as part of FAS as described in measure 15. The resultant modelling will be shared with The Welsh Government and NRW to inform the latest round of flood risk mapping, as described in section 5.
20	Engagement with local communities before, during and after flood events	CC will engage with communities before during and after a flood event, ensuring that communities have increased resilience to flooding. CC will engage with communities advising them of their current flood risk and encouraging the installation of flood mitigation measures such as property level flood protection (PFR). CC will work with any communities that wish to install PFR to ensure effective measures are put in place. Post flooding event, CC will, as far as is reasonably practicable, assist communities in their response to flooding events, for example, by offering disposal of damaged items, providing any other assistance where practicable, such as LLFA flooding statements for insurance claims.
21	Assist communities with the creation and operation of community flood groups	CC cannot remove all flood risk, but local communities that are well prepared for flooding can increase their resilience dramatically. CC will work with communities to develop their own flood risk group and management plan. Local communities will know their area well and CC will work with them to develop flood plans for before, during and after a flood event. CC will have actions within the draft Plan, such as collecting leaf litter or assisting in recovery. We will also assist the communities in updating their plan as and when required.

Reference	Measure	Description of measure
22	Collaborate with other RMA's and organisations to lower flood risk	All RMA's such as DCWW and NRW have a requirement under relevant legislation to adopt their own Flood Risk strategies. CC will collaborate with these RMA's to lower flood risk across Cardiff from all relevant sources. CC currently meet with DCWW on a monthly basis to discuss flooding incidents and FAS that are relevant for both organisations and will work to include further RMA's in the discussions. CC shares a border with Caerphilly County Borough Council, Newport City Council, Rhondda Cynon Taf Council and The Vale of Glamorgan Council. CC will liaise directly with these authorities, acting as the LLFA, to discuss cross border flooding incidents and schemes, whilst also working together with them to lower flood risk to communities on the authority borders.
23	Collaborate with NRW and DCWW regarding pollution incidents	Incidents of pollution are present throughout Cardiff contributing to the poor WFD status of watercourses across Cardiff. CC liaise directly and meet regularly with NRW and DCWW to discuss instances of pollution across the city from residential and commercial properties and also from both consented and unconsented CSO's. Should the pollution be because of a misconnection, DCWW and NRW investigate the misconnection, however, the enforcement powers lie with CC under The Building Act 1984. If the pollution has entered an ordinary watercourse from uncontrolled surface water runoff, from a development site for example, CC will collaborate with NRW to investigate and utilise its enforcement powers under The LDA 1991 if required.
24	School Flooding and Water safety talks	CC Flood Risk Management Team undertake flooding and water safety talks in primary and secondary schools. Flooding talks: Presentation showing all aspects of flooding including resilience and recovery. The impacts of climate change are a key aspect of the talk, ensuring it complies with the new curriculum. Water Safety Talks: CC have worked with Atlantic Crest, a specialist water safety company to develop water safety presentations aimed at the relevant age groups. The talk includes what to do during an emergency involving water, what to do during a flood and also key life skills such as speaking to the emergency services and international lifeguard signals.
25	Collaboration with Academia	There is an emerging issue within the flood risk industry regarding the availability of resource and engineers to allow the industry to grow. The introduction of Schedule 3 of FWMA 2010 has emphasised the need for graduates to enter the flood risk industry and RMA's have a key role to play in this. CC have developed important relationships with The University of Bath, Cardiff University and the University of South Wales, which has resulted in collaboration on a number of levels. This ranges from students undertaking work-based learning placements and dissertations to collaborating with university professors on published journal articles.
26	Riparian Owners	As described in 4.3.7, riparian owners have a number of duties and responsibilities for ordinary watercourses that flow through their land. Along with the guidance described in measure 12, CC will work with riparian owners to ensure effective management and maintenance of ordinary watercourse throughout the city.

3.5.2 Actions for Cardiff Council

Cardiff Council has utilised a catchment-based approach to addressing the draft Plan measures. The measures are centred around the three main rivers that flow through the city, namely the Ely, Taff and Rumney. Actions have also been included which focus on Flatholm Island and city-wide actions. In total there are five flood action plans which accompany the draft Plan for the period 2024 – 2034 these are as follows:

- City Wide
- Flatholm Island
- River Ely
- River Taff
- River Rumney

The actions associated with each of these plans have been linked by CC to the draft Plan Measures these links are presented within Table 9.

Table 9 Summary of draft Plan Actions

Reference	Action	Links to LFRMS Measures
CDFA1	Improve and maintain CC's Flood Risk Page. Advising on mitigation, action and recovery measures pre, during and post flood	13,14,17,20,21
CDFA2	Develop and adopt a surface water management policy in line with Tan 15 guidance	1,2,3,4,5,6
CDFA3	Maintain and update flood risk asset database as required under Section 21 of The Flood and Water Management Act 2010	8
CDFA4	Supply flood risk asset data to interested stakeholders and other RMA's	19,22
CDFA5	Review and maintain CC flooding emergency response plan with the councils Resilience Unit	1,6,13,14,17,18,20,21,22
CDFA6	Assist NRW where required in the mitigation of flood risk from Main River sources, i.e., River Ely, River Rhymney and River Taff	1,19,22
CDFA7	Assist local communities in developing community level local flood risk groups	19,20,21
CDFA8	Provide education facilities with presentations and resources around flooding and climate change to feed into the new curriculum	1,17,20,21,22,24,25
CDFA9	Work with Dŵr Cymru Welsh Water (DCWW) for the removal of surface water from public sewerage systems through surface water removal schemes and SAB approvals	3,9,19,22,23
CDFA10	Ensure any best practice is incorporated into any Section 19 flood investigation reports	13,14
CDFA11	Maintain CC telemetry to capture real time rainfall and water level information	14,16
CDFA12	Enhance and maintain a long-term Capital flood alleviation scheme pipeline adhering to Welsh Governments Business Case Guidance	15,22
CDFA13	Update CC Culverting policy	6,7,9,16,26
CDFA14	Update CC Sandbag policy	6
CDFA15	Develop and maintain Ordinary watercourse guidance	6,12,26
CDFA16	Assist in the development and maintenance of CC Green Infrastructure Plan	2
CDFA17	Review adopted Flood Risk strategy and associated action plans every 2 years	4,6

Reference	Action	Links to LFRMS Measures
CDFA18	Assist CC Planning Authority in the development of the SFCA and replacement LDP	2,5,6,10
CDFA19	Maintain CC Shoreline management plan	4,6
CDFA20	Ensure the adopted shoreline policy of "hold the line" is adhered to	4,6
CDFA21	Develop flood risk policy / process / understanding with neighbouring RMA's	20,22
Ely1	Working with residents at Wroughton Place to develop a local flood risk group	20,21
Ely2	Working with St Fagans Community Council to develop a local flood risk group	20,21
Rhy1	Construction of Coastal Defences on Rhymney Estuary	1,15
Rhy2	Climate Change and Flood Risk School Talks	1,20,21,22
Rhy3	Greener Rumney FBC	1,15,19
Rhy4	Greener Rumney Construction	1,15,19
Taf1	Partake in the River Taff Catchment Masterplan alongside NRW and other RMA's	1,20,21,22
Taf2	Greener Whitchurch Full Business Case / Detailed Design	1,15,19
Taf3	Greener Whitchurch Construction	1,15,19
Taf4	Radyr Court Road BJC	1,15,19
Taf5	Radyr Court Road Construction	1,15
Taf 6	Nant Y Wedal OBC	1,15,19
Taf 7	Nant Y Wedal FBC	1,15,19
Taf 8	Nant Y Wedal Construction	1,15
FLH1	Undertake a T98 Asset survey for whole coastline as required by shoreline management plan	8,22
Notes:	No actions associated with measure 11. CC intend to include action (s) relating to this measure at the two-year review of the LFRMS.	

3.5.3 Justification for scoping out

A ‘Do Nothing’ alternative has been considered when looking to determine whether the actions would occur if the draft Plan did not progress. The following short listed draft Plan actions would achieve their environmental outcomes whether or not they were included within the draft Plan and the inclusion of these measures would not contribute to the SEA objectives. Table 10 focuses on those projects that are existing plans or guidance, where CC’s contribution is limited to their statutory responsibilities or representation of existing data.

Table 10 Justification for Scoping Out Draft LFRMS Measures / Actions (existing plans or guidance)

Reference	Description of action	Justification for scoping out
CDFA15	Develop and maintain Ordinary watercourse guidance	The development of guidance documents will not lead to development or any other change. It is understood that this action will assist users in navigating requirements.
CDFA17	Review adopted Flood Risk strategy and associated action plans every 2 years	Review of the adopted plan every two years cannot lead to development or other change beyond those assessed under other actions. However this action has been considered in

Reference	Description of action	Justification for scoping out
		relation to monitoring timeframes for the LFRMS and Action Plan.
CDFA18	Assist CC Planning Authority in the development of the SFCA and replacement LDP	The Strategic Flood Consequences Assessment (SFCA) provides evidence for and informs other plans, particularly the local plan, which is not proposed by the plan and therefore not assessed within this Environmental Report. Although the development of the replacement LDP has the potential to lead to significant environmental effects, the LDP will be subject to a separate SEA process. Cardiff flood risk will feed into work as a consultee.
CDFA19	Maintain CC Shoreline management plan	The Shoreline Management Plan (SMP) is an existing document that has been subject to a separate SEA process. Updates to the plan are therefore screened out from likely significant effects alone. Depending on changes that have occurred since the SMP, the existing SEA may still be relevant, in developing the scope of an environmental assessment and in identifying the SEA objectives and would be reviewed. If significant changes are proposed, then the SMP will be supported by an updated SEA.
CDFA20	Ensure the adopted shoreline policy of "hold the line" is adhered to	This action requires adherence to an element of the SMP which is not proposed by the plan and is therefore screened out from likely significant effects alone.
FLH1	Undertake a T98 Asset survey for whole coastline as required by shoreline management plan	The T98 asset survey is a non-intrusive visual survey of the coastline as required by the SMP, which has been assessed by a separate plan level HRA. There is potential for the survey to identify works required to maintain the coastline, which could have implications for Severn Estuary European sites, however this would be considered following the results of the survey.

There are a number of project level actions that have been included within the local flood risk management strategy and action plan, these have been included within Table 11. These actions will inherently positively contribute to the SEA outcomes, however as the actions may be considered EIA development at a project level, they have or may be subject to their own EIA process. The likely significant effects of these projects will be considered in detail at project level, and these projects are now suitably progressed that it is no longer appropriate to consider them in the SEA. As these actions have been included within the Plan they are mentioned within Table 11 where the SEA should review compatibility of these projects as part of CC's role as the statutory consultee for planning applications.

Table 11 Justification for Scoping Out Draft LFRMS Measures / Actions (project level actions)

Reference	Description of action	Justification for exclusion
Rhy1	Construction of Coastal Defences on Rhymney Estuary	The construction of coastal defences on Rhymney Estuary has been subject to a separate EIA. These works are not proposed by the plan and are therefore scoped out of the SEA.
Rhy3	Greener Rumney FBC	An outline business case, and a full business case have been completed in relation to the Greener Rumney project. These reports provided detail on the proposed detailed design for Greener Rhymney catchment which is a mature residential suburb within the River Rhymney catchment approximately 1.15 km north of the Severn Estuary SPA, Ramsar and SAC. The proposals involve measures to mitigate surface water flooding within the study area, involving the creation of a wetland in the playing fields; widening of the northern brook; the construction of swales and ponds; a new surface water pipe network; and rain gardens. Many of these features would incorporate diverse planting to provide an ecological enhancement.
Rhy4	Greener Rumney Construction	

Reference	Description of action	Justification for exclusion
		Measures aim to manage peak water flows within the catchment, which is hydrological connected to the tidal section of the River Rhymney, which flows into the Severn Estuary European sites. An EIA screening and Environmental Statement were produced and found that there would be no significant residual environmental effects as a result of geomorphology and coastal processes, historic environment or biodiversity and nature conservation. However there would be significant landscape effects associated with the construction works. Construction site best practice guidelines would be implemented as part of a Construction Environmental Management Plan (CEMP) or similar, including pollution prevention measures and the control of invasive species, which would avoid impacts on the River Rhymney and downstream within the Severn Estuary European sites relating to pollution and the release of invasive species. The proposed works would result in hydrological changes within the River Rhymney catchment, providing capacity for the watercourses to deal with peak water flows, which could alter flows into the Severn Estuary. However, these changes would be insignificant within the wider context of the Severn Estuary European sites. This action would achieve their outcomes whether or not they were included within the LFRMS and are therefore would not strengthen the compatibility with either the SEA objectives already identified.
Taf2	Greener Whitchurch Full Business Case	With reference to the Environmental Impact Assessment (EIA) Screening Report and Outline Business Case (OBC), the scheme involves the implementation of various measures in Whitchurch, approximately 6.74km northwest of the Severn Estuary European sites, to reduce flood risk downstream along Whitchurch Brook. The study area is hydrologically connected via Whitchurch Brook, which flows into the River Taff. As outlined above with respect to the proposed Greener Rumney works and as assessed in the EIA Screening Report, construction site best practice guidelines would be implemented as part of a CEMP or similar. The proposed works will result in hydrological changes within the River Taff catchment, which could alter flows into the Severn Estuary although these changes would be insignificant within the wider context of the Severn Estuary European sites. The EIA Screening Report concluded that the project is unlikely to result in significant negative effects on the environment, whilst beneficial effects are predicted, provided the Greener Whitchurch Construction is developed as per the scheme which the EIA screening was assessed then the objectives held by the LFRMS would strengthen the compatibility with the SEA objectives already identified.
Taf3	Greener Whitchurch Construction	
Taf4	Radyr Court Road BJC	Radyr Court Road involves repairs to failing flood defences along the River Taff to prevent flooding, which could have implications for the Severn Estuary European sites. The River Taff flows into the Severn Estuary and is hydrologically connected to the Severn Estuary European sites. The proposed works are located approximately 7.29 km northwest of these sites. There are no published details available for these works beyond a site plan. These are to be developed following preparation of the BJC. However, it is understood that the gabion baskets along the river are failing, meaning that it is likely that works will be required within and along the banks of the river (personal communication, City of Cardiff Council). Despite the potential implications of the Radyr Court Road construction on the Severn Estuary European sites, it is not appropriate to assess the effects of this individual project within SEA at this stage. The LFRMS is not expected to give rise to any significant adverse environmental effects. The projects listed in Appendix B of the LFRMS will be delivered through other mechanisms, which will be subject to their own environmental assessment processes.
Taf5	Radyr Court Road Construction	
Taf6	Nant Y Wedal OBC	

Reference	Description of action	Justification for exclusion
Taf7	Nant Y Wedal FBC	The construction of the Nant Y Wedal project as set out in the Outline Business Case (OBC) and Full Business Case would lead to the reduction of flood risk from the watercourse as assessed under action Taf8. The study area is located within an urban area of Cardiff approximately 4.20 km northwest from the Severn Estuary European sites. An options appraisal has not yet been undertaken and there are no published details regarding the proposed works. CC has advised that the development would involve the creation of rain gardens and swales to remove water from a culvert (personal communication). Despite the potential implications of the Nant Y Wedal project on the Severn Estuary European sites, it is not appropriate to assess the effects of this individual project within the SEA at this stage. The level of detail currently available is insufficient to make informed decisions against the SEA objectives. Additionally, the SEA's opportunity to alter the objectives of the project is limited. Detailed assessments and decisions can only be made once more comprehensive information is available following the preparation of the Outline Business Case (OBC) and Full Business Case.
Taf 8	Nant Y Wedal Construction	

As a result of scoping out the actions indicated within Table 10 and Table 11 a number of draft Plan measures have been scoped out of the SEA assessment, as they have no scoped in actions. The following measures from the draft Plan? have been scoped out:

- Measure 7: Review and Update Culverting Policy;
- Measure 10: Assist in the Development of the SFCA;
- Measure 11: SuDS Guidance;
- Measure 12: OWC Guidance;
- Measure 15: Flood Alleviation Scheme Development; and
- Measure 26: Riparian Owners.

3.6 Summary of Assessment of the Draft Plan

The measures (and associated actions) to achieve strategy objectives that have been assessed are listed in Table 12, Table 13 and Table 14 and the assessment results are provided in the same Tables. Section 3.4 provides the methodology used in this assessment.

3.6.1 Development, Regeneration and Policy Measures

Table 12 Development, Regeneration and Policy Measures

Ref	Action	1. Protect and enhance designated sites and priority species / habitats	2. Improve access to and enhance natural green and blue space	3. Contribute to the restoration and recovery of biodiversity through delivering net benefits for	4. Support national greenhouse gas emission reduction targets	5.Accommodate for future climate change predictions	6. Protect and enhance the historic environment	7. Protect and enhance groundwater/ surface water resources	8. Protect infrastructure from damage from flooding	9. Preserve and enhance the landscape	10. Improve soil health	11. Support sustainable agricultural practices to reduce flood risk	12. Connection to nature	13. Target measures to support those who are vulnerable and most at risk to flooding	14. Contribute to reduced inequalities	15. Reduce risk of flooding from rivers and surface water	16. Improve water resources management	17. Improve the health of water bodies	18. Contribute to increased community participation	Considerations, Recommendations and Monitoring
Measure 1: Ensure Climate Change Projections are Included in all Aspects of Development and Flood Risk Management																				
CDFA2	Develop and adopt a surface water management policy in line with Tan 15 guidance	0	+ MT	+ MT/LT	0	++ LT	+ LT	+ LT	+ LT	0	+ LT	+ LT	+ LT	+ ST/LT	+ ST/LT	+ LT	+ LT	+ LT	0	**Considerations** Tan 15 guidance encourages the integration of resilient design such as Sustainable Drainage Systems (SuDS) and improvements to water quality a reduction in the risk of flooding and associated hazards, create new habitats, and would support healthier aquatic systems. The action will also enhance ecosystem resilience by encouraging stakeholders to consider climate change predictions and mitigate against extreme weather effects. Tan 15 guidance will encourage developments to incorporate resilient design reduce the effects of extreme flooding on communities, businesses, and heritage assets. Overall, effective surface water management will promote climate resilient design particularly against drought and flooding through the creation and improvement of green and blue spaces.
CDFA5	Review and maintain Cardiff Council flooding emergency response plan with the councils Resilience Unit	0	0	0	0	+ ST/MT	0	0	+ MT/LT	0	0	0	0	+ ST/MT	0	0	0	0	0	**Considerations** An updated flood emergency response plan is anticipated to consider climate change projections to ensure that there is sufficient preparation for increased severity and frequency of extreme weather events by utilising updated strategies, improved coordination, and preventative measures. Overall, improvements to flooding emergency plan would take into account climate change projections the updated plan is expected to reduce the impact of flood events within Cardiff. **Recommendations and Monitoring** The effectiveness of this updated flooding emergency response plan would need to be monitored the effectiveness of the revisions during future events particularly in relation to the effects on at-risk or vulnerable communities.
CDFA6	Assist NRW where required in the mitigation of flood risk from Main River sources, i.e.. River Ely, River Rhymney and River Taff	0	0	+ ST/LT	0	+ LT	0	0	+ LT	0	0	0	0	0	0	+ LT	0	+ LT	0	**Considerations** To assist NRW in mitigating flood risk from main river sources such as the River Ely, River Rhymney, and River Taff, CC are currently supporting a number of infrastructure schemes and propose to continue implementing approaches to help with flood prevention. These project level interventions would have the possibility to have either adverse or beneficial effects on biodiversity. Effective surface water management is key to enhancing ecosystem resilience and adapting to climate change and by supporting NRW, Cardiff can implement local mitigation actions, improving community climate resilience and reducing extreme flooding impacts from main rivers by encouraging that climate change projections are taken into account. **Recommendations and Monitoring** While SuDS aspirations within this plan are not currently detailed, they offer potential for potential land take and land release as a result of their implementation. Enhancing floodplains and hydrogeological systems may also be needed to mitigate main river flood risks. Given the potential adverse effects of this action on biodiversity the environmental assessments associated with these schemes and any new projects should be monitored for their individual and cumulative effects.
CDFA8	Provide education facilities with presentations and resources around flooding and climate change to feed into the new curriculum	0	0	0	0	0	0	0	0	0	0	0	0	+ MT	0	0	0	0	+ MT	**Considerations** Changes to the education curriculum will increase awareness of flood risk among at-risk or vulnerable communities in the long term, while the provision of education facilities will create opportunities for community participation. Although the detail is not currently available there is opportunity to increase understanding of climate change projections within the community, however as this aspiration is focused on school aged children across the borough the effects would be medium to long term. One action included within the plan looks to introduce school talks on a local level. The Plan should monitor how this expands beyond the two schools currently in consideration.

Ref	Action	1. Protect and enhance designated sites and priority species / habitats	2. Improve access to and enhance natural green and blue space	3. Contribute to the restoration and recovery of biodiversity through delivering net benefits for	4. Support national greenhouse gas emission reduction targets	5.Accommodate for future climate change predictions	6. Protect and enhance the historic environment	7. Protect and enhance groundwater/ surface water resources	8. Protect infrastructure from damage from flooding	9. Preserve and enhance the landscape	10. Improve soil health	11. Support sustainable agricultural practices to reduce flood risk	12. Connection to nature	13. Target measures to support those who are vulnerable and most at risk to flooding	14. Contribute to reduced inequalities	15. Reduce risk of flooding from rivers and surface water	16. Improve water resources management	17. Improve the health of water bodies	18. Contribute to increased community participation	Considerations, Recommendations and Monitoring
Rhy2	Climate Change and Flood Risk School Talks	0	0	0	0	0	0	0	0	0	0	0	0	+ MT	0	0	0	0	+ MT	**Considerations** This action is focused in Rumney/ around the Rhymney River where much of the land is currently categorised as being at Low to High risk of flooding from Rivers. The provision of climate change and flood risk talks at one high school and one primary school in the Rumney area could increase the awareness of flood risk and associated climate change projections within the community.
Measure 2: Consultee to the Planning Authority and Building Control																				
CDFA2	Develop and adopt a surface water management policy in line with Tan 15 guidance	0	+ MT	+ MT/LT	0	++ LT	+ LT	+ LT	+ LT	0	+ LT	+ LT	+ LT	+ ST/LT	+ ST/LT	+ LT	+ LT	+ LT	0	**Considerations** Tan 15 guidance encourages the integration of resilient design such as Sustainable Drainage Systems (SuDS) and improvements to water quality a reduction in the risk of flooding and associated hazards, create new habitats, and would support healthier aquatic systems. CC flooding consultee responses will aim to enhance ecosystem resilience by encouraging developments to incorporate resilient design reduce the effects of extreme flooding on communities, businesses, and heritage assets in line with Tan 15 guidance. Overall, effective surface water management will strengthen CC flooding team's consultee responses particularly ensuring that advice given to the planning and building control team ensures developers protect against increased drought and flooding.
CDFA16	Assist in the development and maintenance of Cardiff Council Green Infrastructure Plan	++ MT/LT	+ MT/LT	+ MT/LT	+ MT/LT	+ MT/LT	+/- MT/LT	+/- MT/LT	+ LT	+ MT/LT	+ MT/LT	+ MT/LT	+ MT/LT	+ MT/LT	+ MT/LT	+ MT/LT	+/- MT/LT	+/- MT/LT	+/- MT/LT	**Considerations** Input from the flood risk management team will ensure that flood risk is considered in the development of the Green Infrastructure Plan (GIP). The GIP is expected to support the Planning and building control teams in there advise and decision making in relation to new developments contributing to more resilient and adaptive flood risk management. The GIP should also address carbon reduction, soil health, and regenerative agricultural land management, flood risk mitigation infrastructure protection, pressure on water treatment works, and flooding in vulnerable communities, while improving public access to green spaces and fostering a sense of ownership. **Recommendations and Monitoring** As the measures are not currently known monitoring is recommended to measure the significance of any changes from the 2019 GIP and ensuring that accessibility, inclusivity, and community participation are considered during the planning process.
Measure 3: SuDS Approval Body (SAB)																				
CDFA2	Develop and adopt a surface water management policy in line with Tan 15 guidance	0	+ MT	+ MT/LT	0	++ LT	+ LT	+ LT	+ LT	0	+ LT	+ LT	+ LT	+ ST/LT	+ ST/LT	+ LT	+ LT	+ LT	0	**Considerations** Tan 15 guidance encourages the integration of resilient design such as Sustainable Drainage Systems (SuDS) and improvements to water quality a reduction in the risk of flooding and associated hazards, create new habitats, and would support healthier aquatic systems. This action aims to enhance surface water management policy in line with Tan 15 best practice by encouraging developments to incorporate resilient design reduce the effects of extreme flooding on communities, businesses, and heritage assets.
CDFA9	Work with Dŵr Cymru Welsh Water for the removal of surface water from public sewerage systems through surface water removal schemes and SAB approvals	0	+ MT/LT	+ MT/LT	0	++ MT/LT	+ LT	+ LT	+ LT	0	0	0	+ LT	+ LT	+ MT/LT	+ MT/LT	0	+ LT	0	**Considerations** This action encourages CC to work with DCWW to remove surface water from public sewerage systems through surface water removal schemes and SAB approvals and implementing Sustainable Drainage Systems (SuDS). Diverting surface water away from public sewers into SuDS would reduce flood risk from sewer overflows particularly during heavy rainfall, lowering the likelihood of untreated sewage discharge into water bodies and extending the lifespan of sewer infrastructure. **Recommendations and Monitoring** This action should be monitored to measure improved water quality and the creation of green spaces through SuDS will improve community resilience and reduce impacts on businesses and infrastructure and can provide biodiversity benefits.
Measure 4: Local Flood Risk Strategy																				

Ref	Action	1. Protect and enhance designated sites and priority species / habitats	2. Improve access to and enhance natural green and blue space	3. Contribute to the restoration and recovery of biodiversity through delivering net benefits for	4. Support national greenhouse gas emission reduction targets	5.Accommodate for future climate change predictions	6. Protect and enhance the historic environment	7. Protect and enhance groundwater/ surface water resources	8. Protect infrastructure from damage from flooding	9. Preserve and enhance the landscape	10. Improve soil health	11. Support sustainable agricultural practices to reduce flood risk	12. Connection to nature	13. Target measures to support those who are vulnerable and most at risk to flooding	14. Contribute to reduced inequalities	15. Reduce risk of flooding from rivers and surface water	16. Improve water resources management	17. Improve the health of water bodies	18. Contribute to increased community participation	Considerations, Recommendations and Monitoring
CDFA2	Develop and adopt a surface water management policy in line with Tan 15 guidance	0	+ MT	+ MT/LT	0	++ LT	+ LT	+ LT	+ LT	0	+ LT	+ LT	+ LT	+ ST/LT	+ ST/LT	+ LT	+ LT	+ LT	0	**Considerations** Tan 15 guidance encourages the integration of resilient design such as Sustainable Drainage Systems (SuDS) and improvements to water quality a reduction in the risk of flooding and associated hazards, create new habitats, and would support healthier aquatic systems. **Recommendations and Monitoring** The Local Flood Risk Strategy should be monitored to ensure that it adheres with Tan 15 at each two-year update. The review should monitor how the Plan is performing in encouraging developments to incorporate resilient design reduce the effects of extreme flooding on communities, businesses, and heritage assets.
Measure 5: Surface Water Strategy																				
CDFA2	Develop and adopt a surface water management policy in line with Tan 15 guidance	0	+ MT	+ MT/LT	0	++ LT	+ LT	+ LT	+ LT	0	+ LT	+ LT	+ LT	+ ST/LT	+ ST/LT	+ LT	+ LT	+ LT	0	**Considerations** CC propose to develop a specific Surface Water Management Strategy in line with Section 8 of Tan 15. This action would lead to improvement to water quality a reduction in the risk of flooding and associated hazards, create new habitats, and would support healthier aquatic systems. The action would significantly contribute to considerations of climate change by ensuring stakeholders consider future predictions of increased extreme weather. **Recommendations and Monitoring** The Surface Water Strategy once developed should be monitored to ensure that it adheres with Tan 15 at each two-year update following its publication.
Measure 6: Ensure Compliance with Strategic Policies																				
CDFA2	Develop and adopt a surface water management policy in line with Tan 15 guidance	0	+ MT	+ MT/LT	0	++ LT	+ LT	+ LT	+ LT	0	+ LT	+ LT	+ LT	+ ST/LT	+ ST/LT	+ LT	+ LT	+ LT	0	**Considerations** Measure 6 looks to ensure that all decisions regarding the management of local flood risk comply with all local and national strategic policies, this action looks to ensure that Tan 15 guidance is adhered to. In encouraging the adherence of Tan 15 development would need to be cognisant of resilient design principals such as Sustainable Drainage Systems (SuDS) and ensuring there are improvements to water quality and a reduction in the risk of flooding and associated hazards, as well as creating new habitats which would support healthier aquatic systems. **Recommendations and Monitoring** The Plan should be monitored to ensure that it adheres with Tan 15 at each two-year update.
CDFA5	Review and maintain Cardiff Council flooding emergency response plan with the councils Resilience Unit	0	0	0	0	+ ST/MT	0	0	+ MT/LT	0	0	0	0	+ ST/MT		0	0	0	0	**Considerations** An updated flood energy response plan is anticipated to consider compliance with strategic policies projections to ensure that there is sufficient preparation for increased severity and frequency of extreme weather events by utilising updated strategies, improved coordination, and preventative measures. Overall, improvements to flooding emergency plan would take into account strategic policies and best practice. The updated plan is expected to reduce the impact of flood events within Cardiff. **Recommendations and Monitoring** The effectiveness of this updated flooding emergency response plan would need to be monitored the effectiveness of the revisions during future events particularly in relation to the effects on at-risk or vulnerable communities.
Measure 7: Review and Update Culverting Policy																				
No assessment undertaken as associated actions scoped out.																				
Measure 8: Flood Risk Asset Register																				
CDFA3	Maintain and update flood risk asset database as required under Section 21 of The Flood and Water Management Act 2010	0		0	0	0	0	0	+ ST	0	0	0	0	0	0	0	0	0	0	**Considerations** Keeping the flood risk asset database updated enhances the ability for CC and relevant stakeholders to manage and mitigate flood risks effectively. **Recommendations and Monitoring** Ensuring that the asset database register is up to date will enable effective maintenance and management of flood risk assets.
Measure 9: Land Drainage Act 1991 Duties																				

Ref	Action	1. Protect and enhance designated sites and priority species / habitats	2. Improve access to and enhance natural green and blue space	3. Contribute to the restoration and recovery of biodiversity through delivering net benefits for	4. Support national greenhouse gas emission reduction targets	5.Accommodate for future climate change predictions	6. Protect and enhance the historic environment	7. Protect and enhance groundwater/ surface water resources	8. Protect infrastructure from damage from flooding	9. Preserve and enhance the landscape	10. Improve soil health	11. Support sustainable agricultural practices to reduce flood risk	12. Connection to nature	13. Target measures to support those who are vulnerable and most at risk to flooding	14. Contribute to reduced inequalities	15. Reduce risk of flooding from rivers and surface water	16. Improve water resources management	17. Improve the health of water bodies	18. Contribute to increased community participation	Considerations, Recommendations and Monitoring
CDFA9	Work with Dŵr Cymru Welsh Water for the removal of surface water from public sewerage systems through surface water removal schemes and SAB approvals	0	+ MT/LT	+ MT/LT	0	++ MT/LT	+ LT	+ LT	+ LT	0	0	0	+ LT	+ LT	+ LT	+ MT/LT	0	+ LT	0	**Considerations** The LDA 1991 places statutory duties on CC as the LLFA these include the duties of both permitting and enforcement powers. CC as LLFA would be able to work with Developers and DCWWto remove surface water from public sewerage systems through surface water removal schemes and SAB approvals and implementing Sustainable Drainage Systems (SuDS). Diverting surface water away from public sewers into SuDS would reduce flood risk from sewer overflows particularly during heavy rainfall, lowering the likelihood of untreated sewage discharge into water bodies and extending the lifespan of sewer infrastructure. **Recommendations and Monitoring** This action should be monitored to measure how CC as LLFA have encouraged collaboration between DCWW and developers to improve water quality and the creation of green spaces through SuDS will improve community resilience and reduce impacts on businesses and infrastructure, and can provide biodiversity benefits.
Measure 10: Assist in the Development of the SFCA																				
No assessment undertaken as associated actions scoped out.																				
Measure 11: SuDS Guidance																				
No assessment undertaken as associated actions scoped out.																				
Measure 12: OWC Guidance																				
No assessment undertaken as associated actions scoped out.																				

3.6.2 Prevention, Protection and Response Measures

Table 13 Prevention, Protection and Response Measures

Ref	Action	1. Protect and enhance designated sites and priority species / habitats	2. Improve access to and enhance natural green and blue space	3. Contribute to the restoration and recovery of biodiversity through deliverine net benefits for	4. Support national greenhouse gas emission reduction targets	5.Accommodate for future climate change predictions	6. Protect and enhance the historic environment	7. Protect and enhance groundwater/ surface water resources	8. Protect infrastructure from damage from flooding	9. Preserve and enhance the landscape	10. Improve soil health	11. Support sustainable agricultural practices to reduce flood risk	12. Connection to nature	13. Target measures to support those who are vulnerable and most at risk to flooding	14. Contribute to reduced inequalities	15. Reduce risk of flooding from rivers and surface water	16. Improve water resources management	17. Improve the health of water bodies	18. Contribute to increased community participation	Considerations, Recommendations and Monitoring
Measure 13: Response to Flooding																				
CDFA1	Improve and maintain Cardiff Councils Flood Risk Page. Advising on mitigation, action and recovery measures pre, during and post flood	0	0	0	0	+ LT	0	0	0	0	0	0	0	+ ST	0	+ ST	0	0	0	**Considerations** Maintaining an up-to-date website with the response to flood events both during and after the event will ensure that communities and businesses can access relevant advice more readily. The improvement and maintenance of the webpage will encourage good practices, though the benefits will be minor for both minor and major developments due to statutory requirements. This could reduce small-scale damage to infrastructure caused by flooding. Users will be able to review the latest advice on the flood risk page, increasing awareness of mitigation measures and reducing flood risk and damage to existing properties and infrastructure in both the short and long term.
CDFA5	Review and maintain Cardiff Council flooding emergency response plan with the council Resilience Unit	0	0	0	0	+ ST/MT	0	0	+ MT/LT	0	0	0	0	+ ST/MT	0	0	0	0	0	**Considerations** An updated flood emergency response plan is anticipated to set out a framework to investigate flooding incidences to ensure that each flood event is learnt from by utilising updated strategies, improved coordination, and evaluating the effectiveness of preventative measures. **Recommendations and Monitoring** The effectiveness of this updated flooding emergency response plan in supporting the investigation of flooding incidences should be monitored.
CDFA10	Ensure any best practice is incorporated into any Section 19 flood investigation reports	0	0	0	0	+ ST	0	0	+ ST	0	0	0	0	+ ST	0	0	0	0	0	**Considerations** Section 19 flood investigations will contribute to a more resilient and adaptive approach to flooding and flood risk management as a result of improved preparedness and mitigation strategies, thereby consistently improving with the aim to reduce the risk of damage or disruption caused by flooding. Enhanced maintenance, risk identification and mitigation would lead to more resilient and effective flood defence infrastructure. Additionally, enhanced accuracy and reliability, along with improved recommendations, can target at-risk and vulnerable communities to improve the response to flooding within Cardiff.
Measure 14: Investigate all Flooding Incidents																				
CDFA1	Improve and maintain Cardiff Councils Flood Risk Page. Advising on mitigation, action and recovery measures pre, during and post flood	0	0	0	0	+ LT	0		0	0	0	0	0	+ ST	0	+ ST		0	0	**Considerations** Maintaining an up-to-date website with the response to flood events both during and after the event will ensure that communities and businesses can access relevant advice more readily. The improvement and maintenance of the webpage will encourage good practices, though the benefits will be minor for both minor and major developments due to statutory requirements. This could reduce small-scale damage to infrastructure caused by flooding. Users will be able to review the latest advice on the flood risk page, increasing awareness of mitigation measures and reducing flood risk and damage to existing properties and infrastructure in both the short and long term.
CDFA5	Review and maintain Cardiff Council flooding emergency response plan with the council Resilience Unit	0	0	0	0	+ ST/MT	0	0	+ MT/LT	0	0	0	0	+ ST	0	0	0	0	0	**Considerations** An updated flood emergency response plan is anticipated to set out a framework to investigate flooding incidences to ensure that each flood event is learnt from by utilising updated strategies, improved coordination, and evaluating the effectiveness of preventative measures. **Recommendations and Monitoring** The effectiveness of this updated flooding emergency response plan in supporting the investigation of flooding incidences should be monitored.
CDFA10	Ensure any best practice is incorporated into any Section 19 flood investigation reports	0	0	0	0	+ ST	0	0	+ ST	0	0	0	0	+ ST	0	0	0	0	0	**Considerations** Section 19 flood investigations are one of the methods that all flood incidences will be investigated. The findings of the flood investigations will contribute to a more resilient and adaptive approach to flooding and flood risk management as a result of improved preparedness and mitigation strategies, thereby consistently improving with the aim to reduce the risk of damage or disruption caused by flooding. Enhanced maintenance, risk identification and mitigation would lead to more resilient and effective flood defence infrastructure. Enhanced accuracy and reliability, along with improved recommendations, would target at-risk and vulnerable communities to improve the response to flooding within Cardiff.

CDFA11	Maintain Cardiff Council telemetry to capture real time rainfall and water level information	0	0	0	0	+ ST	0	0	+ ST	0	0	+ LT	0	+ ST	0	0	0		0

Considerations

Real-time telemetry data can significantly enhance flood response and planning, leading to more resilient infrastructure and reduced flood impacts. This data supports both short-term and permanent improvements in flood defence design and land management, including critical infrastructure.

It is not currently known whether the live telemetry data would be made available if made publicly or to select stakeholders. If made widely available it could raise flood risk awareness among vulnerable communities, further mitigating flood impacts.

Recommendations and Monitoring

More modelling is recommended to inform design and implementation of flood defence infrastructure so that it is more resilient. The overall use of real-time data is crucial for investigation and response of flood incidents.

Measure 15: Flood Alleviation Scheme Development

No assessment undertaken as associated actions scoped out.

Measure 16: Critical Culvert Maintenance and Telemetry

CDFA11	Maintain Cardiff Council telemetry to capture real time rainfall and water level information	0	0	0	0	+ ST	0	0	+ ST	0	0	+ LT	0	+ ST	0	0	0	0	0

Considerations

Real-time telemetry data can significantly enhance flood response and planning, resulting in more resilient infrastructure and reduced flood impacts. The video and level data supports both short-term and permanent improvements in flood defence design and land management, ensuring that the critical infrastructure (culverts) are maintained and CC as LLFA can react quickly in response to flood events.

Improvements to the ongoing maintenance of these assets is critical to the mitigation of flood risk whilst ensuring the longevity of the assets.

Measure 17: Internal Staff Training

CDFA1	Improve and maintain Cardiff Councils Flood Risk Page. Advising on mitigation, action and recovery measures pre, during and post flood	0	0	0	0	+ LT	0	0	0	0	0	0	0	+ ST	0	+ ST	0	0	0
CDFA5	Review and maintain Cardiff Council flooding emergency response plan with the councils Resilience Unit	0	0	0	0	+ ST/MT	0	0	+ MT/LT	0	0	0	0	+ ST/MT	0	0	0	0	0
CDFA8	Provide education facilities with presentations and resources around flooding and climate change to feed into the new curriculum	0	0	0	0	0	0	0	0	0	0	0	0	0 MT	0	0	0	0	0 MT

Considerations

Maintaining an up-to-date website will ensure that communities and businesses can access advice more readily. There will be a negligible impact on Heritage assets as they adhere to Cadw's advice and are aware of Cardiff's flood prevention policies. The improvement and maintenance of the webpage will encourage good practices, though the benefits will be minor for both minor and major developments due to statutory requirements.

This could reduce small-scale damage to infrastructure caused by flooding. Users will be able to review the latest advice on the flood risk page, increasing awareness of mitigation measures and reducing flood risk and damage to existing properties and infrastructure in both the short and long term.

Recommendations and Monitoring

It is recommended that CC staff should be provided training in line with the updated Flood Risk Page and training relevance monitored to ensure it's kept up to date with the latest mitigation, action and recovery measures.

Considerations

An updated flood emergency response plan is anticipated to set out a framework to investigate flooding incidences to ensure that each flood event is learnt from by utilising updated strategies, improved coordination, and evaluating the effectiveness of preventative measures.

Recommendations and Monitoring

Internal training should be provided to relevant CC staff to ensure that the emergency response plan is followed correctly.

Considerations

Changes to the education curriculum will increase awareness of flood risk among at-risk or vulnerable communities in the long term, while the provision of education facilities will create opportunities for community participation.

Although the detail is not currently available there is opportunity to increase understanding of climate change projections within the community, however as this aspiration is focused on school aged children across the borough the effects on internal staff straining would be minimal.

Measure 18: Consultee to Cardiff Councils Resilience Management Unit

CDFA5	Review and maintain Cardiff Council flooding emergency response plan with the councils Resilience Unit	0	0	0	0	+ ST/MT	0	0	+ MT/LT	0	0	0	0	+ ST/MT	0	0	0	0	0

Considerations

An updated flood emergency response plan is anticipated to set out a framework to investigate flooding incidences to ensure that each flood event is learnt from by utilising updated strategies, improved coordination, and evaluating the effectiveness of preventative measures.

Recommendations and Monitoring

As a statutory requirement it is expected that this action would take place in order to achieve the outcomes set out within Measure 18. The effectiveness of this updated flooding emergency response plan in supporting Cardiff Councils Resilience Management Unit should be reviewed.

Measure 19: Sharing of Surface Water Modelling

CDFA 4	Supply flood risk asset data to interested stakeholders and other RMA's	0	0	0	0	+ ST	0	0	+ ST	0	0	0	0	+ ST/MT	0	0 LT	0	0	0
CDFA6	Assist NRW where required in the mitigation of flood risk from Main River sources, i.e. River Ely, River Rhymney and River Taff	0	0	+ ST/LT	0	+ LT	0	0	+ LT	0	0	0	0	0	0	+ LT	0	+ LT	0
CDFA7	Assist local communities in developing community level local flood risk groups	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CDFA9	Work with Dŵr Cymru Welsh Water for the removal of surface water from public sewerage systems through surface water removal schemes and SAB approvals	0	+ MT/LT	+ MT/LT	0	++ MT/LT	+ LT	+ LT	+ LT	0	0	0	+ LT	+ LT	+ MT/LT	+ MT/LT	0	+ LT	0

Considerations

Maintaining an updated flood risk asset database will support the effective management and mitigation of flood risk within the catchment, thereby increasing the resilience of flood defence infrastructure.

Recommendations and Monitoring

Sharing any surface water modelling undertaken as part of the FAS (part of measure 15) readily to The Welsh Government and NRW will allow them to actively participate in managing local flood risk and will foster collaboration between Risk Management Authorities (RMAs).

Considerations

To assist NRW in mitigating flood risk from main river sources such as the River Ely, River Rhymney, and River Taff, CC are currently supporting a number of infrastructure schemes and propose to continue implementing approaches to help with flood prevention. These project level interventions would have the possibility to have either adverse or beneficial effects on biodiversity. Each of these project provide modelling data which could be shared with The Welsh Government and NRW to inform the latest round of flood risk mapping

Recommendations and Monitoring

Given the potential effects of this action on biodiversity the environmental assessments associated with these schemes and any new projects should be monitored for their individual and cumulative effects.

Considerations

CC assisting local communities to develop community level local flood risk groups does not contribute to the LLFAs ability to share FAS data with The Welsh Government and NRW.

Considerations

This action encourages CC to work with DCWW to remove surface water from public sewerage systems through surface water removal schemes and SAB approvals and implementing Sustainable Drainage Systems (SuDS).

Diverting surface water away from public sewers into SuDS would reduce flood risk from sewer overflows particularly during heavy rainfall, lowering the likelihood of untreated sewage discharge into water bodies and extending the lifespan of sewer infrastructure. Data used to model this work could be shared with The Welsh Government and NRW to inform the latest round of flood risk mapping.

Recommendations and Monitoring

The surface water removal schemes should be monitored effectively to ensure the creation of green spaces and enhancement of biodiversity as well as increased resident accessibility.

3.6.3 Community, Stakeholder and Collaboration Measures

Table 14 Community, Stakeholder and Collaboration Measures

Ref	Action	1. Protect and enhance designated sites and priority species / habitats	2. Improve access to and enhance natural green and blue space	3. Contribute to the restoration and recovery of biodiversity through delivering net benefits for biodiversity	4. Support national greenhouse gas emission reduction targets	5.Accommodate for future climate change predictions	6. Protect and enhance the historic environment	7. Protect and enhance groundwater/ surface water resources	8. Protect infrastructure from damage from flooding	9. Preserve and enhance the landscape	10. Improve soil health	11. Support sustainable agricultural practices to reduce flood risk	12. Connection to nature	13. Target measures to support those who are vulnerable and most at risk to flooding	14. Contribute to reduced inequalities	15. Reduce risk of flooding from rivers and surface water	16. Improve water resources management	17. Improve the health of water bodies	18. Contribute to increased community participation	Considerations, Recommendations and Monitoring
Measure 20: Engagement with Local Communities Before, During and After Flood Events																				
CDFA1	Improve and maintain Cardiff Councils Flood Risk Page. Advising on mitigation, action and recovery measures pre	0	0	0	0	+ LT	0	0	0	0	0	0	0	+ ST	0	+ ST	0	0	0	**Considerations** Maintaining an up-to-date website will ensure that communities and businesses can access advice more readily. The improvement and maintenance of the webpage will encourage good practices. Local communities will be able to review the latest advice on the flood risk page before, during and after flood events increasing awareness of mitigation measures and reducing flood risk and damage to existing properties and infrastructure.
CDFA5	Review and maintain Cardiff Council flooding emergency response plan with the councils Resilience Unit	0	0	0	0	+ ST/MT	0	0	+ MT/LT	0	0	0	0	+ ST/MT	0	0	0	0	0	**Considerations** An updated flood emergency response plan developed with the resilience unit is expected to be informed by some stakeholder engagement with local communities to investigate flooding incidences and areas of concern. This will ensure that the emergency response plan considers each flood event by utilising community knowledge. **Recommendations and Monitoring** The engagement with local communities on this updated flooding emergency response plan should be monitored.
CDFA7	Assist local communities in developing community level and local flood risk groups	+ ST	0	0	0	+ ST	0	0	0	0	0	0	+ LT	+ MT	0	0	0	0	++ MT/LT	**Considerations** Supporting communities in developing local flood risk groups will lead to minor benefits for designated sites, priority species and habitats. Engagement before events will ensure best climate resilience practices are shared with the community and the impacts of extreme flooding on communities and businesses reduced by leveraging local knowledge and experiences. Assisting local communities will foster a sense of ownership and guardianship of the landscape.
CDFA8	education with and flooding nge to feed Provide facilities presentations resources around flood and climate change to f	0	0	0	0	0	0	0	0	0	0	0	0	+ MT	0	0	0	0	+ MT	**Recommendations and Monitoring** Changes to the education curriculum will increase awareness of flood risk among at-risk or vulnerable communities before, during and after event, while the provision of education facilities will create opportunities for community participation. These measures will have medium-term, permanent impacts
CDFA 21	Develop flood risk policy / process / understanding with neighbouring RMA's	0	0	0	0	0	+ ST/MT	0	+ ST/MT	0	0	0	0	0	0	0	0	0	+ ST/MT	**Considerations** The Plan proposed to work with neighbouring Risk Management Authorities this will encourage cross collaboration and create an alignment in flood risk mitigation and management methods. Having a focus on issues beyond each RMA's boarder will increase the resilience of shared flood defence infrastructure, property and historic environment. These efforts will have short to medium-term impacts and provide permanent benefits.
Ely1	Working with residents at Wroughton Place to develop a local flood risk group	+ ST	0	0	0	+ ST	0	0	0	0	0	0	+ LT	+ MT	0	0	0	0	++ MT/LT	**Considerations** Working with residents at Wroughton Place to develop a local flood risk group will lead to an increase in engagement within the area. Wroughton Place is located almost entirely in an area of high and medium flood risk from rivers which means flood events are common for local residents. The benefits of this engagement would be that relevant information relating to the local environment and climate resilience measures can be disseminated appropriately within the community by leveraging local knowledge and experiences. Assisting the local community will foster a sense of ownership and guardianship of the landscape. **Recommendations and Monitoring** The plan should encourage that stakeholder engagement is monitored by these flood groups to ensure that all aspects of the community are involved.

Ref	Action	1. Protect and enhance designated sites and priority species / habitats	2. Improve access to and enhance natural green and blue space	3. Contribute to the restoration and recovery of biodiversity through delivering net benefits for biodiversity	4. Support national greenhouse gas emission reduction targets	5.Accommodate for future climate change predictions	6. Protect and enhance the historic environment	7. Protect and enhance groundwater/ surface water resources	8. Protect infrastructure from damage from flooding	9. Preserve and enhance the landscape	10. Improve soil health	11. Support sustainable agricultural practices to reduce flood risk	12. Connection to nature	13. Target measures to support those who are vulnerable and most at risk to flooding	14. Contribute to reduced inequalities	15. Reduce risk of flooding from rivers and surface water	16. Improve water resources management	17. Improve the health of water bodies	18. Contribute to increased community participation	Considerations, Recommendations and Monitoring
Ely2	Working with St Fagans Community Council to develop a local flood risk group	+ ST	0	0	0	+ ST	+	0	0	0	0	0	+ LT	+ MT	0	0	0	0	++ MT/LT	**Considerations** Working with residents at St Fagans to develop a local flood risk group will lead to an increase in engagement within the area. St Fagans is located almost entirely in an area of high and medium flood risk from surface water and small watercourses which means flood events are common for local residents. There are a significant number of listed buildings and designated sites in St Fagans including St Fagans Castle which is also a Grade I Historic Park/Garden. St Fagans is a designated conservation area within Cardiff as well as a Special Landscape Area (St Fagans Lowlands and Ely Valley). The benefits of this engagement would be that relevant information relating to the local environment and climate resilience measures can be disseminated appropriately within the community by leveraging local knowledge and experiences. Assisting the local community will foster a sense of ownership and guardianship of the landscape. **Recommendations and Monitoring** The plan should encourage that stakeholder engagement is monitored by these flood groups to ensure that all aspects of the community are involved.
Rhy2	Climate Change and Flood Risk School Talks	0	0	0	0	0	0	0	0	0	0	0	0	+ MT	0	0	0	0	+ MT	**Considerations** CC's provision of climate change and flood risk school talks at one high school and one primary school in Rumney will increase the awareness of flood risk among at-risk or vulnerable communities in the short to long term. This action is focused in Rumney/ around the Rhymney River where much of the land is categorised as being at Low to High risk of flooding from Rivers.
	Measure 21: Assist Communities with the Creation and Operation of Community Flood Groups																			
CDFA1	Improve and maintain Cardiff Councils Flood Risk Page. Advising on mitigation, action and recovery measures pre, during and post flood	0	0	0	0	+ LT	0	0	0	0	0	0	0	+ ST		+ ST	0	0	0	**Considerations** Maintaining an up-to-date website will ensure that communities can access advice more readily. There will be a negligible impact on heritage assets as stakeholders adhere to Cadw's advice and are aware of Cardiff's flood prevention policies. The measure's other policies including CDFA 7 will provide a forum for the sharing of this information. The improvement and maintenance of the webpage will encourage good practices, though the benefits will be minor for both minor and major developments due to statutory requirements. This could reduce small-scale damage to infrastructure caused by flooding. Communities will be able to review the latest advice on the flood risk page, increasing awareness of mitigation measures and reducing flood risk and damage to existing properties and infrastructure in both the short and long term.
CDFA5	Review and maintain Cardiff Council flooding emergency response plan with the councils Resilience Unit	0	0	0	0	+ ST/MT	0	0	+ MT/LT	0	0	0	0	+ ST/MT	0	0	0	0	0	**Considerations** An updated flood emergency response plan developed with the resilience unit is expected to be informed by some stakeholder engagement with local communities to investigate flooding incidences and areas of concern. This will ensure that the emergency response plan considers each flood event by utilising community knowledge. **Recommendations and Monitoring** The engagement with local communities via the community flood groups on this updated flooding emergency response plan should be monitored.
CDFA7	Assist local communities in developing community level local flood risk groups	+ ST	0	0	0	+ ST	0	0	0	0	0	0	+ LT	+ MT	0	0	0	0	++ MT/LT	**Considerations** Supporting communities in developing local flood risk groups will lead to minor benefits for designated sites, priority species and habitats. Engagement before events will ensure best climate resilience practices are shared with the community and the impacts of extreme flooding on communities and businesses reduced by leveraging local knowledge and experiences. Assisting local communities via the community flood groups will foster a sense of ownership and guardianship of the landscape.
CDFA8	Provide education facilities with presentations and resources around climate and flooding	0	0	0	0	0	0	0	0	0	0	0	0	+ MT	0	0	0	0	+ MT	**Considerations** Changes to the education curriculum will increase awareness of flood risk among at-risk or vulnerable communities before, during and after event, while the provision of education facilities will create opportunities for community participation. These measures will have medium-term, permanent impacts

Ref	Action	1. Protect and enhance designated sites and priority species / habitats	2. Improve access to and enhance natural green and blue space	3. Contribute to the restoration and recovery of biodiversity through delivering net benefits for biodiversity	4. Support national greenhouse gas emission reduction targets	5.Accommodate for future climate change predictions	6. Protect and enhance the historic environment	7. Protect and enhance groundwater/ surface water resources	8. Protect infrastructure from damage from flooding	9. Preserve and enhance the landscape	10. Improve soil health	11. Support sustainable agricultural practices to reduce flood risk	12. Connection to nature	13. Target measures to support those who are vulnerable and most at risk to flooding	14. Contribute to reduced inequalities	15. Reduce risk of flooding from rivers and surface water	16. Improve water resources management	17. Improve the health of water bodies	18. Contribute to increased community participation	Considerations, Recommendations and Monitoring
Ely1	Working with residents at Wroughton Place to develop a local flood risk group	+ ST	0	0	0	+ ST	0	0	0	0	0	0	+ LT	+ MT	0	0	0	0	++ MT/LT	**Considerations** Working with residents at Wroughton Place to develop a local flood risk group will lead to an increase in engagement within the area. Wroughton Place is located almost entirely in an area of high and medium flood risk from rivers which means flood events are common for local residents. The benefits of this engagement would be that relevant information relating to the local environment and climate resilience measures can be disseminated appropriately within the community by leveraging local knowledge and experiences. Assisting the local community will foster a sense of ownership and guardianship of the landscape. **Recommendations and Monitoring** The plan should encourage that stakeholder engagement is monitored by these flood groups to ensure that all aspects of the community are involved.
Ely2	Working with St Fagans Community Council to develop a local flood risk group	+ ST	0	0	0	+ ST	+	0	0	0	0	0	+ LT	+ MT	0	0	0	0	++ MT/LT	**Considerations** Working with residents at St Fagans to develop a local flood risk group will lead to an increase in engagement within the area. St Fagans is located almost entirely in an area of high and medium flood risk from surface water and small watercourses which means flood events are common for local residents. There are a significant number of listed buildings and designated sites in St Fagans including St Fagans Castle which is also a Grade I Historic Park/Garden. St Fagans is a designated conservation area within Cardiff as well as a Special Landscape Area (St Fagans Lowlands and Ely Valley). The benefits of this engagement would be that relevant information relating to the local environment and climate resilience measures can be disseminated appropriately within the community by leveraging local knowledge and experiences. Assisting the local community will foster a sense of ownership and guardianship of the landscape. **Recommendations and Monitoring** The plan should encourage that stakeholder engagement is monitored by these flood groups to ensure that all aspects of the community are involved.
Rhy2	Climate Change and Flood Risk School Talks	0	0	0	0	0	0	0	0	0	0	0	0	+ MT	0	0	0	0	+ MT	**Considerations** CC's's provision of climate change and flood risk school talks at one high school and one primary school in Rumney will increase the awareness of flood risk among at-risk or vulnerable communities in the short to long term. This action is focused in Rumney/ around the Rhymney River where much of the land is categorised as being at Low to High risk of flooding from Rivers.
	Measure 22: Collaborate with Other RMA's and Organisations to Lower Flood Risk																			
CDFA 4	Supply flood risk asset data to interested stakeholders and other RMA's	0	0	0	0	+ ST	0	0	+ ST	0	0	0	0	+ ST/MT	0	0	0	0	0	**Considerations** Maintaining an updated flood risk asset database will support the effective management and mitigation of flood risk within the catchment, thereby increasing the resilience of flood defence infrastructure. Sharing any surface water modelling undertaken as part of the FAS (part of measure 15) readily to The Welsh Government and NRW will allow them to actively participate in managing local flood risk and will foster collaboration between Risk Management Authorities (RMAs).
CDFA5	Review and maintain Cardiff Council flooding emergency response plan with the councils Resilience Unit	0	0	0	0	+ ST/MT	0	0	+ MT/LT	0	0	0	0	+ ST/MT	0	0	0	0	0	**Considerations** An updated flood emergency response plan is anticipated to set out a framework to investigate flooding incidences to ensure that each flood event is learnt from by utilising updated strategies, improved coordination, and evaluating the effectiveness of preventative measures. CC should collaborate with other RMA's and organisations to ensure approaches to emergency response to flooding are aligned.
CDFA6	Assist NRW where required in the mitigation of flood risk from Main River sources, ie. River Ely, River Rhymney and River Taff	0	0	+ ST/LT	0	+ LT	0	0	+ LT	0	0	0	0	0	0	+ LT	0	+ LT	0	**Considerations** To assist NRW in mitigating flood risk from main river sources such as the River Ely, River Rhymney, and River Taff, CC are currently supporting a number of infrastructure schemes and propose to continue implementing approaches to help with flood prevention. These project level interventions would have the possibility to have either adverse or beneficial effects on biodiversity. Each of these projects are transboundary requiring collaboration with a number of RMAs and LLFA's. Understanding of risk between each stakeholder would be beneficial to ensure that cumulative transboundary effects are mitigated.

Ref	Action	1. Protect and enhance designated sites and priority species / habitats	2. Improve access to and enhance natural green and blue space	3. Contribute to the restoration and recovery of biodiversity through delivering net benefits for biodiversity	4. Support national greenhouse gas emission reduction targets	5.Accommodate for future climate change predictions	6. Protect and enhance the historic environment	7. Protect and enhance groundwater/ surface water resources	8. Protect infrastructure from damage from flooding	9. Preserve and enhance the landscape	10. Improve soil health	11. Support sustainable agricultural practices to reduce flood risk	12. Connection to nature	13. Target measures to support those who are vulnerable and most at risk to flooding	14. Contribute to reduced inequalities	15. Reduce risk of flooding from rivers and surface water	16. Improve water resources management	17. Improve the health of water bodies	18. Contribute to increased community participation	Considerations, Recommendations and Monitoring
																				Recommendations and Monitoring Given the potential adverse effects of this action on biodiversity the environmental assessments associated with these schemes and any new projects should be monitored for their individual and cumulative effects.
CDFA8	Provide education facilities with presentations and resources around flooding and climate change to feed into the new curriculum	0	0	0	0	0	0	0	0	0	0	0	0	0 MT	0	0	0	0	0 MT	**Considerations** CC provide education facilities with presentations and resources around flooding and climate change to feed into the new curriculum would lead to a negligible contribution to Cardiff's ability to collaborate with other RMA's and organisations to Lower Flood Risk. Any effects of revision to the curriculum on RMA's and organisations would be indirect and not experienced in the short term.
CDFA9	Work with Dŵr Cymru Welsh Water for the removal of surface water from public sewerage systems through surface water removal schemes and SAB approvals	0	+ MT/LT	+ MT/LT	0	++ MT/LT	+ LT	+ LT	+ LT	0	0	0	+ LT	+ LT	+ MT/LT	+ MT/LT	0	+ LT	0	**Considerations** This action encourages CC to work with DCWW to remove surface water from public sewerage systems through surface water removal schemes and SAB approvals and implement Sustainable Drainage Systems (SuDS). Diverting surface water away from public sewers into SuDS would reduce flood risk from sewer overflows particularly during heavy rainfall, lowering the likelihood of untreated sewage discharge into water bodies and extending the lifespan of sewer infrastructure. Data used to model this work could be shared with RMA and other stakeholders such as The Welsh Government and NRW to inform the latest round of flood risk mapping. **Recommendations and Monitoring** The surface water removal schemes should be monitored effectively to ensure the creation of green spaces and enhancement of biodiversity as well as increased resident accessibility.
CDFA 21	Develop flood risk policy / process / understanding with neighbouring RMA's	0	0	0	0	0	+ ST/MT	0	+ ST/MT	0	0	0	0	0	0	0	0	0	+ ST/MT	**Considerations** The Plan proposed to work with neighbouring Risk Management Authorities this will encourage cross collaboration and create an alignment in flood risk mitigation and management methods. Having a focus on issues beyond each RMA's boarder will increase the resilience of shared flood defence infrastructure, property and historic environment. These efforts will have short to medium-term impacts and provide permanent benefits.
Rhy2	Climate Change and Flood risk School Talks	0	0	0	0	0	0	0	0	0	0	0	0	0 MT	0	0	0	0	0 MT	**Considerations** CC provision of school talks at a high school and one primary school in Rumney would lead to a negligible contribution to Cardiff's ability to collaborate with other RMA's and organisations to Lower Flood Risk. This action is focused in Rumney/ around the Rhymney River where much of the land is categorised as being at Low to High risk of flooding from Rivers.
	Measure 23: Collaborate with NRW and DCWW Regarding Pollution Incidents																			
CDFA9	Work with Dŵr Cymru Welsh Water for the removal of surface water from public sewerage systems through surface water removal schemes and SAB approvals	0	+ MT/LT	+ MT/LT	0	++ MT/LT	+ LT	+ LT	+ LT	0	0	0	+ LT	+ LT	+ MT/LT	+ MT/LT	0	+ LT	0	**Considerations** This action encourages CC to work with DCWW to remove surface water from public sewerage systems through surface water removal schemes and SAB approvals and implement Sustainable Drainage Systems (SuDS). Diverting surface water away from public sewers into SuDS would reduce flood risk from sewer overflows particularly during heavy rainfall, lowering the likelihood of untreated sewage discharge into water bodies and extending the lifespan of sewer infrastructure. **Recommendations and Monitoring** Additional collaboration between CC as LLFA, NRW and DCWW should ensure that combined sewers overflow events are monitored, and the associated pollution events also monitored.
	Measure 24: School Flooding and Water Safety Talks																			
CDFA8	Provide education facilities with presentations and resources around flooding and climate change to feed into the new curriculum	0	0	0	0	0	0	0	0	0	0	0	0	+ MT	0	0	0	0	+ MT	**Recommendations** Changes to the education curriculum will increase awareness of flood risk among at-risk or vulnerable communities in the long term, while the provision of education facilities will create opportunities for community participation.

Ref	Action	1. Protect and enhance designated sites and priority species / habitats	2. Improve access to and enhance natural green and blue space	3. Contribute to the restoration and recovery of biodiversity through delivering net benefits for biodiversity	4. Support national greenhouse gas emission reduction targets	5.Accommodate for future climate change predictions	6. Protect and enhance the historic environment	7. Protect and enhance groundwater/ surface water resources	8. Protect infrastructure from damage from flooding	9. Preserve and enhance the landscape	10. Improve soil health	11. Support sustainable agricultural practices to reduce flood risk	12. Connection to nature	13. Target measures to support those who are vulnerable and most at risk to flooding	14. Contribute to reduced inequalities	15. Reduce risk of flooding from rivers and surface water	16. Improve water resources management	17. Improve the health of water bodies	18. Contribute to increased community participation	Considerations, Recommendations and Monitoring
	Measure 25: Collaboration with Academia																			
CDFA8	Provide education with and facilities presentations resources around flooding and climate change to feed	0	0	0	0	0	0	0	0	0	0	0	0	+ MT	0	0	0	0	+ MT	**Considerations** Changes to the education curriculum will increase awareness of flood risk among at-risk or vulnerable communities in the long term, while the provision of education facilities will create opportunities for community participation.
	Measure 26: Riparian Owners																			
	No assessment undertaken as associated actions scoped out.																			

4. Assessment Findings

The assessment has identified that the implementation of draft Plan could lead to cumulative positive effects through the reduction of overall flood risk to both people and property. Overall, many of the measures result in broadly neutral or minor positive effects in respect of the SEA Objectives in relation to reduction in flooding, risks from flooding, protection of infrastructure and improvements to biodiversity, following completion of the assessment the following sections summarise how the draft Plan for the period 2024 to 2034 meets the SEA objectives.

4.1 SEA Objective 1: Protect and enhance designated sites and priority species / habitats

The proposed measures identified within the draft Plan will collectively result in actions to protect and enhance habitats within the Plan area. Given several of the measures within the draft Plan are updates to existing policies, the overall positive effects are generally identified where measures and their actions identify physical interventions, for example, green infrastructure, blue infrastructure, and the incorporation of SuDS. These projects (Greener Rumney, Greener Whitchurch, Radyr Court Road and Nant Y Wedal) however, without mitigation could include adverse effects on sensitive ecological features, such as temporary or permanent disturbance to habitats / loss of biodiversity. As these actions are individual projects, they are each subject to EIA. It is expected that they will follow best practice in order to minimise likely significant effects. Further consideration should be given to specific mitigation measures that could help ameliorate such effects at detailed design stage.

The HRA appropriate assessment conducted alongside this SEA (30062902-ARP-REP-HRA-3.0) concludes that given the implementation of the mitigation measures proposed, the plan is unlikely to give rise to adverse effects on the integrity of the Severn Estuary designated sites.

4.2 SEA Objective 2: Improve access to and enhance natural green and blue space

Improving and maintaining Cardiff Council's Flood Risk Page is crucial. By providing up-to-date information on flood risks and mitigation measures, residents and stakeholders can make informed decisions, reducing the impact of floods on green and blue spaces. Similarly, adopting a surface water management policy in line with TAN 15 guidance ensures sustainable management of surface water, protecting natural habitats from flooding and erosion. Maintaining and updating the flood risk asset database helps in identifying and managing flood-prone areas, ensuring the protection and enhancement of natural spaces. A well-maintained emergency response plan ensures quick and effective action during floods, minimising damage to green and blue spaces.

Engaging local communities in flood risk management by developing local flood risk groups and educational presentations will foster a sense of ownership and responsibility towards protecting natural spaces. In addition, working with Dŵr Cymru Welsh Water (DCWW) on surface water removal schemes helps reduce the burden on public sewerage systems, preventing overflow and protecting natural water bodies.

Developing and maintaining a green infrastructure plan would integrate flood risk management into urban planning, enhancing biodiversity and recreational opportunities. Regularly reviewing and updating flood risk strategies would ensure they remain effective in protecting natural spaces.

Infrastructure and construction projects, such as constructing coastal defences and participating in river catchment masterplans, taking steps to protect shorelines and riverbanks would preserving these natural green and blues spaces. Projects like Greener Rumney and Greener Whitchurch focus on enhancing green spaces in specific areas, improving access and biodiversity. The capturing and monitoring of real-time rainfall and water level data through telemetry systems would help CC in early flood detection and response, protecting natural spaces from flood damage. Conducting asset surveys ensures the proper maintenance and protection of coastal and riverine environments.

4.3 SEA Objective 3: Contribute to the restoration and recovery of biodiversity through delivering net benefits for biodiversity

Improving Cardiff Council's Flood Risk Page and adopting a surface water management policy in line with TAN 15 guidance can significantly protect Cardiff's natural habitats from flood damage and erosion. By maintaining and updating the flood risk asset database, Cardiff can identify and safeguard critical habitats, ensuring the preservation of biodiversity. Additionally, a well-maintained emergency response plan ensures quick action during floods, minimising damage to ecosystems, particularly in flood-prone areas like the River Ely, River Rhymney, and River Taff.

Engaging local communities in flood risk management through the development of local flood risk groups fosters stewardship and protection of local biodiversity. Educational resources and presentations on flooding and climate change can raise awareness and encourage actions that benefit biodiversity. Collaborating with Dŵr Cymru Welsh Water on surface water removal schemes would help protect aquatic habitats from pollution and overflow, while assisting Natural Resources Wales in flood mitigation efforts preserves river ecosystems and their biodiversity.

Infrastructure projects such as constructing coastal defences on the Rhymney Estuary and participating in the River Taff Catchment Masterplan protect shorelines and riverbanks, preserving species within the Severn Estuary designated sites. Projects like Greener Rumney and Greener Whitchurch focus on enhancing green spaces, improving habitats and biodiversity. Monitoring real-time rainfall and water levels through telemetry systems and conducting asset surveys ensure the proper maintenance and protection of Cardiff's coastal and riverine environments, making them more resilient to flooding and climate change.

4.4 SEA Objective 4: Support national greenhouse gas emission reduction targets

Improving and maintaining Cardiff Council's Flood Risk Page, along with adopting a surface water management policy in line with TAN 15 guidance, would help mitigate the impacts of flooding in areas like the River Ely, River Rhymney, and River Taff. This reduces the need for energy-intensive recovery efforts and infrastructure repairs, thereby lowering greenhouse gas emissions. Maintaining and updating the flood risk asset database, and ensuring best practices in flood investigation reports, also contribute to efficient management and reduced emissions.

Engaging local communities in Cardiff, such as those in Wroughton Place and St Fagans, in developing flood risk groups fosters a culture of resilience and sustainability. Providing educational resources about flooding and climate change, especially through school talks, encourages behaviours that reduce carbon footprints, such as better water management and energy conservation. This community-level engagement is crucial for long-term emission reductions.

Collaborating with Dŵr Cymru Welsh Water on surface water removal schemes and assisting Natural Resources Wales in flood mitigation efforts help protect Cardiff's natural water bodies and reduce the risk of flooding. Infrastructure projects like the construction of coastal defences on the Rhymney Estuary and participation in the River Taff Catchment Masterplan ensure that natural habitats are preserved, supporting biodiversity and carbon sequestration. By implementing these measures, Cardiff can contribute to national greenhouse gas emission reduction targets through improved flood management, community engagement, and the protection of natural ecosystems.

4.5 SEA Objective 5: Accommodate for future climate change predictions

By implementing these measures, Cardiff will contribute to national greenhouse gas emission reduction targets and enhance its resilience to climate change. Improving and maintaining Cardiff Council's Flood Risk Page, along with adopting a surface water management policy in line with TAN 15 guidance, will help mitigate the impacts of flooding in areas like the River Ely, River Rhymney, and River Taff. This will reduce the need for energy-intensive recovery efforts and infrastructure repairs, thereby lowering greenhouse gas emissions. Maintaining and updating the flood risk asset database, and ensuring best practices in flood investigation reports, will also contribute to efficient management and reduced emissions. The major positive impacts which contribute to increased climate resilience, are associated with the measures and their associated actions which identify physical interventions for example, green infrastructure, blue infrastructure, and the incorporation of SuDS as well as the appointment of CC as the SAB.

Engaging local communities in Cardiff, such as those in Wroughton Place and St Fagans, in developing flood risk groups will foster a culture of resilience and sustainability. Providing educational resources about flooding and climate change, especially through school talks, will encourage behaviours that reduce carbon footprints, such as better water management and energy conservation. This community-level engagement is crucial for long-term emission reductions.

Collaborating with Dŵr Cymru Welsh Water on surface water removal schemes and assisting Natural Resources Wales in flood mitigation efforts will help protect Cardiff's natural water bodies and reduce the risk of flooding. Infrastructure projects like the construction of coastal defences on the Rhymney Estuary and participation in the River Taff Catchment Masterplan will ensure that natural habitats are preserved, supporting biodiversity and carbon sequestration. By integrating climate projections into planning and decision-making processes, Cardiff will enhance its flood risk management strategies, ensuring that infrastructure projects are designed to withstand future climate impacts. This proactive approach will help Cardiff better protect its natural green and blue spaces, support biodiversity, and contribute to national greenhouse gas emission reduction targets.

4.6 SEA Objective 6: Protect and enhance the historic environment

The proposed measures identified within the draft Plan will collectively result in actions which protect and enhance the historic environment to a minor extent. The majority of measures and their associated actions will have a negligible impact on the historic environment. The remaining minor positive impacts are associated with measures that identify physical interventions, specifically the incorporation of SuDS and the appointment of CC as the SAB to facilitate these developments. Additional minor positive impacts are associated with measures that engage with local communities before during and after flood events especially in specific areas where there are a high number of listed buildings and monuments such as St Fagans. The remaining measures and associated actions are not applicable to the historic environment or will have no effect.

Furthermore, Cardiff's efforts to enhance and maintain a long-term capital flood alleviation scheme pipeline, update policies related to culverting and sandbag use, and develop ordinary watercourse guidance demonstrate a comprehensive strategy to manage flood risks. By reviewing and maintaining the Shoreline Management Plan and adhering to the "hold the line" policy, Cardiff ensures that coastal historic sites are protected from erosion and sea-level rise. Collaborating with Dŵr Cymru Welsh Water (DCWW) to remove surface water from public sewerage systems and participating in the River Taff Catchment Masterplan further strengthens Cardiff's resilience against flooding, ultimately safeguarding its historic environment for future generations.

4.7 SEA Objective 7: Protect and enhance groundwater / surface water resources

Cardiff can significantly protect and enhance its groundwater and surface water resources. Improving and maintaining Cardiff Council's Flood Risk Page ensures that residents and stakeholders are well-informed about mitigation, action, and recovery measures before, during, and after floods. This proactive approach helps prevent contamination of groundwater and surface water by ensuring timely and effective responses to flood events. Developing and adopting a surface water management policy in line with TAN 15 guidance, along with maintaining and updating the flood risk asset database, ensures that the city can manage surface water effectively, reducing the risk of pollution and safeguarding water quality.

Additionally, Cardiff's commitment to assisting Natural Resources Wales (NRW) in mitigating flood risks from major rivers like the Ely, Rhymney, and Taff, and working with local communities to develop flood risk groups, fosters a collaborative approach to water management. This collaboration is crucial in protecting both groundwater and surface water resources from the adverse effects of flooding. Providing educational resources about flooding and climate change to schools integrates awareness into the curriculum, ensuring future generations understand the importance of preserving Cardiff's water resources.

4.8 SEA Objective 8: Protect infrastructure from damage from flooding

Cardiff can significantly reduce damage to infrastructure, including transport systems, caused by flooding. Keeping the Flood Risk Page updated ensures that residents and stakeholders are well-prepared with information on mitigation, action, and recovery measures, which helps protect critical infrastructure like roads and bridges from severe flood impacts. Adopting a surface water management policy in line with TAN 15

guidance and maintaining a comprehensive flood risk asset database allows the city to manage surface water efficiently, thereby reducing the likelihood of infrastructure damage.

Moreover, the plan would reduce pressure on water treatment works by collaborating with Dŵr Cymru Welsh Water (DCWW) to remove surface water from public sewerage systems. This action helps prevent overloading the treatment facilities during heavy rainfall events, ensuring they operate more effectively and reducing the risk of contamination. Additionally, providing educational resources about flooding and climate change to schools ensures that future generations understand the importance of managing water resources and infrastructure protection.

Furthermore, the plan helps protect and increase the resilience of flood defence infrastructure. Enhancing and maintaining a long-term capital flood alleviation scheme, updating culverting and sandbag policies, and developing guidance for ordinary watercourses demonstrate a thorough approach to flood risk management.

4.9 SEA Objective 9: Preserve and enhance the landscape

The proposed measures identified within the draft Plan will collectively result in actions which will have a negligible effect on preserving and enhancing the landscape. The majority of the measures and their associated actions will have no effect or a negligible long term overall effect. The single identified positive impact is associated with the impact on the development and maintenance of the CC Green Infrastructure Plan; however, more monitoring is required to determine the impact on the condition of the protected and designated landscapes.

4.10 SEA Objective 10: Improve soil health

The proposed measures identified within the draft Plan will collectively result in actions which have a negligible impact on improving soil health. Minor positive impacts on improving soil health are associated with the development of a surface water management policy in line with Tan 15 guidance including the incorporation of SuDS schemes.

4.11 SEA Objective 11: Support sustainable agricultural practices to reduce flood risk

The proposed measures identified within the draft Plan will collectively result in actions which have a negligible impact on supporting sustainable agricultural practices to reduce flood risk. Minor positive impacts are associated with the development of a surface water management policy and the assisting in the development and maintenance of the CC GIP, however at this stage the objectives of the GIP are unknown. In addition, the maintenance of the CC telemetry to capture real time rainfall and water level data will also provide a minor positive impact in supporting agricultural practices to reduce flood risk.

4.12 SEA Objective 12: Connection to nature

The proposed measures identified within the draft Plan will collectively result in actions which have an overall minor positive impact on connection to nature. Minor positive impacts are associated with measures that identify physical interventions, specifically the incorporation of SuDS and the appointment of CC as the SAB to facilitate these developments. Additional minor positive impacts are associated with measures and their associated actions which focus on engaging with local communities and action which develop local flood risk groups e.g. in Wroughton Place and St Fagans. The remaining measures and associated actions are not applicable or will have no effect/ a negligible effect on connection to nature.

4.13 SEA Objective 13: Target measures to support those who are vulnerable and most at risk to flooding

The proposed measures identified within the draft Plan will collectively result in actions which have a minor positive impact on supporting those who are vulnerable and at most risk to flooding. Minor positive effects are associated with measures that aim to improve climate resilience and response to flooding in the draft Plan area as well as the provision of education facilities and resources. Further monitoring of impacts is required to determine whether the proposed measures successfully target support to those who are most at risk of flooding in the Plan area.

4.14 SEA Objective 14: Contribute to reduced inequalities

The proposed measures identified within the draft Plan will collectively result in actions which have a minor positive effect on contributing to reduced inequalities. Minor positive impacts are primarily associated with the incorporation of SuDS and surface water removal schemes and SAB approvals. The remaining measures and associated actions are not applicable or will have no effect/ a negligible effect on contributing to reduced inequalities.

4.15 SEA Objective 15: Reduce risk of flooding from rivers and surface water

The proposed measures identified within the draft Plan will collectively assist with the reduction of flooding from rivers and surface water. The draft Plan considers the importance of improving and maintaining CC's Flood Risk Page to provide timely and accurate information on mitigation, action, and recovery measures before, during, and after a flood event. These measures will ensure that residents and stakeholders such as DCWW and NRW are well-informed and prepared to respond effectively to flood risks.

The development and adoption of a surface water management policy in line with Tan 15 guidance (CDFA2) will lead to a positive permanent long-term effect on the manage surface water runoff and reduce the risk of flooding in urban areas. Maintaining and updating the flood risk asset database, as required under Section 21 of the Flood and Water Management Act 2010, will provide a comprehensive and up-to-date record of flood risk assets. This data will be supplied to interested stakeholders and other RMAs to support coordinated flood risk management efforts.

The action plan also includes reviewing and maintaining CC's flooding emergency response plan in collaboration with the council's Resilience Unit. This will ensure that emergency response procedures are robust and effective. Assisting NRW in mitigating flood risk from main river sources, such as the River Ely, River Rhymney, and River Taff, will further enhance flood protection. Moreover, the plan emphasises the importance of assisting local communities in developing community-level local flood risk groups, providing education facilities with presentations and resources on flooding and climate change, and working with DCWW to remove surface water from public sewerage systems through surface water removal schemes and SAB approvals.

4.16 SEA Objective 16: Improve water resources management

The proposed measures identified within the draft Plan will collectively assist with contributing to increased community participation. The development and adoption of a surface water management policy in line with Tan 15 (CDFA2) guidance will help manage surface water runoff and reduce the risk of flooding in urban areas. Maintaining and updating the flood risk asset database, as required under Section 21 of The Flood and Water Management Act 2010, will provide a comprehensive and up-to-date record of flood risk assets. This data will be supplied to interested stakeholders and other RMAs to support coordinated flood risk management efforts, encouraging collaboration and active participation from various community members and organisations. Particularly working with local communities such as those in St Fagans and Wroughton Place to develop local flood risk groups will empower residents to take proactive steps in managing flood risks.

The action plan also includes reviewing and maintaining CC's flooding emergency response plan in collaboration with the council's Resilience Unit. This will ensure that emergency response procedures are robust and effective. Assisting NRW in mitigating flood risk from main river sources, such as the River Ely, River Rhymney, and River Taff, will further enhance flood protection. Additionally, working with DCWW to remove surface water from public sewerage systems through surface water removal schemes and SAB approvals will help alleviate pressure on Cardiff's infrastructure. These initiatives, along with maintaining CC telemetry to capture real-time rainfall and water level information, will empower communities to take proactive steps in managing flood risks and contribute to a more resilient and engaged society.

4.17 SEA Objective 17: Improve the health of water bodies

Overall, the measures contained within the LFRMS seek to reduce flood risk, which may act as a pathway for pollutants to enter the water environment. As set out in Section 5.2 we recommend that CC ensure that the health of water bodies is monitored over the period of the draft Plan.

4.18 SEA Objective 18: Contribute to increased community participation

Direct measures such as the creation of flood action groups and increased flood monitoring systems could improve community awareness and resilience and help to reduce overall stress levels, in addition to reducing the potential for people to be negatively affected by flooding. In addition to this, community activities and education programmes could help to improve community cohesion, therefore creating an improved sense of wellbeing in the local community. This could further compound the beneficial effects when reacting to flood events, through the potential for increased resilience through mutual community support networks. Indirect benefits that could also add to overall community wellbeing could stem from an improvement in biodiversity and landscape measures. These measures could increase the areas of accessible open space available for recreation, which could lead to mental and physical health benefits.

5. Mitigation and Monitoring

5.1 Mitigation

Mitigation measures in the form of recommendations were identified in the individual assessments throughout the SEA process, these recommendations are presented against each measure's actions where relevant in Table 12, Table 13 and Table 14.

5.2 Monitoring

A series of indicators have been identified that will enable the performance of the draft Plan to be monitored through its implementation period. Monitoring measures have been clearly linked back to the respective SEA objectives to demonstrate the full assessment / implementation cycle

The draft Plan has been developed so that its progress and success can be easily and accurately measured through the completion of the flood actions. This in turn will ensure the strategy objectives and measures are achieved as they will be present within all of the flood actions.

The national strategy is formally reviewed on a six yearly cycle in line with the flood risk regulations 2009 requirements. To align with the national strategy, the local strategy will be formally reviewed every two years by Cardiff Councils Cabinet and Environmental Scrutiny committees.

The Action Plan will be reviewed on an annual basis by the relevant Council departments, with an update provided to Cardiff Councils Cabinet every two years.

All updates will be communicated to the public via the Councils stakeholder engagement channels through a revised flood action plan, with all superseded plans being available on the Councils website.

Table 15 below presents the proposed monitoring recommendations which have been made as part of this SEA.

Table 15 Proposed Monitoring for draft Plan Measures

Measure	Action	Proposed Monitoring
Development, Regeneration and Policy Measures		
1	CDFA5	The effectiveness of the updated flooding emergency response plan and any revisions needs to be monitored during future events, especially regarding its impact on at-risk or vulnerable communities.
	CDFA6	Given the potential effects of this action on biodiversity the environmental assessments associated with these schemes and any new projects should be monitored for their individual and cumulative effects.
2	CDFA16	As the measures are not currently known monitoring is recommended to measure the significance of any changes from the 2019 GIP and ensuring that accessibility, inclusivity, and community participation are considered during the planning process.
3	CDFA9	The surface water removal schemes should be monitored to measure how CC as LLFA have encouraged collaboration between DCWW and developers to improve water quality and the creation of green spaces

Measure	Action	Proposed Monitoring
		through SuDS will improve community resilience and reduce impacts on businesses and infrastructure, and can provide biodiversity benefits.
4	CDFA2	The Local Flood Risk Strategy should be monitored to ensure that it adheres with Tan 15 at each two-year update. The review should monitor how the Plan is performing in encouraging developments to incorporate resilient design reduce the effects of extreme flooding on communities, businesses, and heritage assets.
5	CDFA2	The Surface Water Strategy once developed should be monitored to ensure that it adheres with Tan 15 at each two-year update following its publication.
6	CDFA2	The Plan should be monitored to ensure that it adheres with Tan 15 at each two-year update.
	CDFA5	The effectiveness of the updated flooding emergency response plan and any revisions needs to be monitored during future events, especially regarding its impact on at-risk or vulnerable communities.
8	CDFA3	Ensuring that the asset database register is up to date will enable effective maintenance and management of flood risk assets.
9	CDFA9	This action should be monitored to measure how CC as LLFA have encouraged collaboration between DCWW and developers to improve water quality and the creation of green spaces through SuDS will improve community resilience and reduce impacts on businesses and infrastructure, and can provide biodiversity benefits.
Prevention, Protection and Response Measures		
13	CDFA5	The effectiveness of this updated flooding emergency response plan in supporting the investigation of flooding incidences should be monitored.
14	CDFA5	The effectiveness of this updated flooding emergency response plan in supporting the investigation of flooding incidences should be monitored.
17	CDFA1	It is recommended that CC staff should be provided training in line with the updated Flood Risk Page and training relevance monitored to ensure it is kept up to date with the latest mitigation, action and recovery measures.
18	CDFA5	As a statutory requirement it is expected that this action would take place in order to achieve the outcomes set out within Measure 18. The effectiveness of this updated flooding emergency response plan in supporting Cardiff Councils Resilience Management Unit should be reviewed.
19	CDFA4	Sharing any surface water modelling undertaken as part of the FAS (part of measure 15) readily to The Welsh Government and NRW will allow them to actively participate in managing local flood risk and will foster collaboration between Risk Management Authorities (RMAs).
	CDFA6	Given the potential adverse effects of this action on biodiversity the environmental assessments associated with these schemes and any new projects should be monitored for their individual and cumulative effects.
	CDFA9	The surface water removal schemes should be monitored effectively to ensure the creation of green spaces and enhancement of biodiversity as well as increased resident accessibility.
Community, Stakeholder and Collaboration Measures		
20	CDFA5	The engagement with local communities on this updated flooding emergency response plan should be monitored.
	Ely1	The plan should encourage that stakeholder engagement is monitored by these flood groups to ensure that all aspects of the community are involved.
	Ely2	The plan should encourage that stakeholder engagement is monitored by these flood groups to ensure that all aspects of the community are involved.
21	CDFA5	The engagement with local communities via the community flood groups on this updated flooding emergency response plan should be monitored.

Measure	Action	Proposed Monitoring
	Ely1	The plan should encourage that stakeholder engagement is monitored by these flood groups to ensure that all aspects of the community are involved.
	Ely2	The plan should encourage that stakeholder engagement is monitored by these flood groups to ensure that all aspects of the community are involved.
22	CDFA6	Given the potential adverse effects of this action on biodiversity the environmental assessments associated with these schemes and any new projects should be monitored for their individual and cumulative effects.
	CDFA9	The surface water removal schemes should be monitored effectively to ensure the creation of green spaces and enhancement of biodiversity as well as increased resident accessibility.
23	CDFA9	Additional collaboration between CC as LLFA, NRW and DCWW should ensure that combined sewers overflow events are monitored, and the associated pollution events also monitored.

6. Conclusions

This document provides the SEA Environmental Report which accompanies the draft Local Flood Risk Management Strategy and Action Plan (the draft Plan). It provides a summary of the baseline conditions and key issues which exist within Cardiff. A comprehensive review of Plans, Policies and Programmes is also included which has considered the wider context in which the Plan will function.

After developing an understanding of the plan area, the draft Plan document was appraised against a set of SEA objectives and decision-making questions. These have been used consistently through the assessments of each of the measures and their constituents' actions in order to determine the likely environmental effects.

Following the assessment of the draft Plan a number of recommendations were identified in the individual assessments throughout the thorough SEA process, these recommendations are presented against each measure action where relevant in Section 4.

It is therefore considered that the measures in the draft Plan taken together will result in the reduction in local flood risk over the strategy period and are generally considered to offer positive effects overall (some potentially significant) against the SEA Objectives, in particular improving health and wellbeing, minimising the risk of and from flooding, biodiversity gain, protecting soil and improving water quantity, quality and flow.

7. Next Steps

This SEA Environmental Report, which sets out the outcome of the SEA process that apply to Tasks A to C of the SEA Directive[7] will next be subject to a process of consultation and decision-making.

In relation to this stage of consultation and decision making the Directive says

"The authorities [with relevant environmental responsibilities] and the public… shall be given an early and effective opportunity within appropriate time frames to express their opinion on the draft plan or programme and the accompanying Environmental Report before the adoption of the plan or programme" (Article 6(2)).

"The environmental report …, the opinions expressed [in responses to consultation] and the results of any transboundary consultations … shall be taken into account during the preparation of the plan or programme and before its adoption…" (Article 8).

"…when a plan or programme is adopted, the [environmental] authorities… [and] the public … are informed and the following items [shall be] made available to those so informed: (a) the plan or programme as adopted, (b) a statement summarising how environmental considerations have been integrated into the plan or

programme…. [including] the reasons for choosing the plan or programme as adopted, in light of other reasonable alternatives dealt with, and (c) the measures decided concerning monitoring" (Article 9(1)).

The draft SEA Environmental Report will form an appendix to the draft Plan and will be made available for consultation alongside it. CC will submit their consultation draft to NRW and Cadw for consultation.

Following the outcome of the draft Plan consultation process, any changes made to the draft Plan as a result of comments from consultees will be included within an SEA Environmental Statement which will explain how consultation was taken into account and any changes to the Plan.

The SEA Environmental Report and SEA Environmental Statement will accompany the final Plan.

7.1 Milestones

The anticipated milestones in the SEA and Flood Risk Management planning processes are outlined in Table 16.

Table 16 Anticipated milestones

Milestone	Dates
Consultation closes on the draft Local Flood Risk Management Strategy and Action Plan	**February 2025**
Flood Risk Management Strategy and Action Plan Adoption Statement Published	**May 2025**
Local Flood Risk Management Plan and Action Plan Published.	**June 2025**

7.2 How to respond to this consultation

We are seeking your views on this environmental report and have set out some specific consultation questions below. The consultation closes March 2025.

Appendix A

Plans, Policies and Programmes

Appendix B

Baseline Conditions

Appendix C

Responses to the SEA Scoping Opinion

Plans, programmes and environmental protection objectives review

This review of plans, programmes and environmental protection objectives aims to inform the Strategic Environmental Assessment (SEA) by identifying key documents that contain direction on environmental issues. The summary listed in the below tables includes a short summary of what each of the Plans, Programmes or Objectives (PPO) covers, the relationship they have with the Cardiff Council Flood Risk Management Strategy and Action Plan (the Plan) and which environmental topics they specifically relate to. Each table focuses on plans, programmes and protection objectives applicable to different scales:

- Table A.1: provides a summary of the international plans programme and protection objectives;
- Table A.2: provides a summary of the national plans (UK) programmes and protection objectives;
- Table A.3: provides a summary of the regional (Wales) plans programmes and protection objectives; and
- Table A.4: provides a summary of the local (Cardiff) plans programme and protection objectives.

A.1.1 International plans, programmes and protection objectives

Table A.1 International plans, programmes, and protection objectives

Document name	Description	Relationship to the Plan	Links to SEA topics
International			
UN Sustainable Development Goals (2015)	The Sustainable Development Goals (SDGs) were adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity. The 17 SDGs are integrated—they recognize that action in one area will affect outcomes in others, and that development must balance social, economic and environmental sustainability. The SDGs are: • SDG 1: No Poverty • SDG 2: Zero Hunger • SDG 3: Good Health and Well-Being • SDG 4: Quality Education • SDG 5: Gender Equality • SDG 6: Clean Water and Sanitation • SDG 7: Affordable and Clean Energy • SDG 8: Decent Work and Economic Growth • SDG 9: Industry, Innovation and Infrastructure • SDG 10: Reduce Inequalities • SDG 11: Sustainable Cities and Communities • SDG 12: Responsible Consumption and Production • SDG 13: Climate Action • SDG 14: Life Below Water • SDG 15: Life on Land • SDG 16: Peace, Justice and Strong Institutions • SDG 17: Partnership for the Goals	The EA's 2025 plan sets out how they will contribute to the UN SDGs, by building a nation resilient to climate change healthy air, land and water green growth and a sustainable future. The Plan should commit to the integration of the SDGs. In particular, focusing on meaningful contribution to SDG 11, 14 and 15. This should include looking at the targets and indicators for each SDG and consider how to transpose these into KPIs at a local level.	All topics.

Appendix A – Plans, Programmes and Environmental Protection Objectives

Document name	Description	Relationship to the Plan	Links to SEA topics
Convention on the Conservation of European Wildlife and Natural Habitats (ETS No. 104)	The Convention aims to ensure conservation of wild flora and fauna species and their habitats. Special attention is given to endangered and vulnerable species, including endangered and vulnerable migratory species. Member parties are required to undertake appropriate measures to ensure the conservation of the habitats of the wild flora and fauna species. Such measures should be included in the Parties planning and development policies and pollution control, with particular attention to the conservation of wild flora and fauna.	The Plan will conserve wild flora and fauna species and associated habitat. This includes endangered species.	Biodiversity
Convention Concerning the Protection of the World Cultural and Natural Heritage (UNESCO, 1972)	The Convention defines the kind of natural or cultural sites which can be considered for inscription on the World Heritage List. The Convention sets out the duties of States Parties in identifying potential sites and their role in protecting and preserving them. By signing the Convention, each country pledges to conserve not only the World Heritage sites situated on its territory, but also to protect its national heritage.	The Plan should be developed to ensure that it supports the protection and preservation of UNESCO World Heritage sites. Although there are no World Heritage Sites within the catchment area, the Plan should strive to align with the overarching principle set out in Article 4; ensuring the identification, protection, conservation, presentation and transmission of cultural and natural heritage.	Biodiversity, Land use and Landscape and Cultural Heritage.
Convention on Wetlands of International Importance especially as Waterfowl Habitat (UNESCO, 1971)	The Convention is an intergovernmental treaty that aims to conserve wetlands through local and national action and international cooperation. Wetlands of International Importance (Ramsar sites) declared under the Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971 are considered European designated sites as a matter of Government Policy.	The Plan will aim to conserve and enhance Ramsar sites and avoid both direct and indirect adverse effects to these sites.	Biodiversity
Convention on Biological Diversity	The Convention on Biological Diversity (CBD) is the international legal instrument for "the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources" that has been ratified by 196 nations. Its overall objective is to encourage actions, which will lead to a sustainable future. The CBD covers biodiversity at all levels: ecosystems, species and genetic resources.	The Plan will conserve and enhance biological diversity through avoiding negative impacts to habitat and species and delivering biodiversity net gain.	Biodiversity
Paris Agreement (UN, 2015)	The Paris Agreement is a legally binding international treaty on climate change. It was adopted by 196 Parties at the UN Climate Change	The Plan will support the commitments in the Paris Agreement by helping to mitigate the effects of climate change through improving water management in the catchment. The aim of	Climate and carbon

Appendix A – Plans, Programmes and Environmental Protection Objectives

Document name	Description	Relationship to the Plan	Links to SEA topics
	Conference (COP21) in Paris, France, on 12 December 2015. It entered into force on 4 November 2016. Its overarching goal is to hold "the increase in the global average temperature to well below 2°C above pre-industrial levels" and pursue efforts "to limit the temperature increase to 1.5°C above pre-industrial levels." The Agreement sets long-term goals to guide all nations: • substantially reduce global greenhouse gas emissions to limit the global temperature increase in this century to 2 degrees Celsius while pursuing efforts to limit the increase even further to 1.5 degrees; • review countries' commitments every five years; and • provide financing to developing countries to mitigate climate change, strengthen resilience and enhance abilities to adapt to climate impacts.	the scheme is to help to reduce the current and future impacts of flooding. The scheme will also look to reduce carbon emissions, for example through the use of nature-based solutions. This will help support the commitments of the Paris Agreement, including reaching net zero by 2050.	
Rio Convention 1992	The United Nations Conference on Environment and Development (UNCED), also known as the 'Earth Summit', was held in Rio de Janeiro, Brazil, from 3-14 June 1992. The Rio Conventions are three interconnected international agreements that address critical environmental challenges. They emerged from the 1992 Earth Summit in Rio de Janeiro, where governments discussed climate change, desertification, and biodiversity loss. The conventions collectively support adaptation, sustainable development, and resilience through knowledge-sharing, capacity-building, and financial support.	The Plan will support the commitments made in the Rio Conventions by enhancing biodiversity and mitigating the effects of climate change through improving water management across the wider area.	Biodiversity, Climate and carbon, Water environment
Bern Convention 1979	The Convention on the Conservation of European Wildlife and Natural Habitats, also known as the Bern Convention, was adopted in Bern on September 19, 1979. Its primary aim is to promote cooperation among signatory countries to conserve wild flora, fauna, and their natural habitats. Additionally, the convention seeks to protect endangered migratory species. Notably, it was the first international treaty to address both species and habitats, bringing countries together to take action for nature conservation	The Plan will aim to conserve wild flora, fauna, and natural habitats within CC by avoiding negative impacts to habitat and species and enhancing biodiversity.	Biodiversity

A.1.2 National plans, programmes and protection objectives

Table A.2 National plans, programmes and protection objectives

Document name	Description	Relationship to the Plan	Links to SEA topics
UK			
Clean Air Strategy 2019	This strategy sets out the comprehensive actions required across all parts of government and society to improve air quality. The strategy sets out how the government will: • protect the nation's health; • protect the environment; • secure clean growth and innovation; • reduce emissions from transport, homes, farming and industry; and • monitor our progress.	The Plan should aim to not only reduce pollutants, but also to improve air quality as much as possible, particularly where air quality is poor, thus using Air Quality Management Areas to support prioritisation of interventions.	Population and human health (communities), Biodiversity and Air Quality.
Clean Growth Strategy (2017)	This strategy sets out proposals for decarbonising all sectors of the UK economy through the 2020s. It explains how the whole country can benefit from low carbon opportunities, while meeting national and international commitments to tackle climate change. This includes carbon emissions associated with water supply.	The Plan should consider how to decarbonise water needed in water processing, water pumping and flood management and seek to boost the carbon sequestration and natural capital of the land within the catchment.	Population and human health (communities), Biodiversity, Climate and carbon, Air Quality, Infrastructure and Transport and Resources and Waste.
Climate Change Act 2008	The Climate Change Act 2008 commits the UK to reducing GHG emissions by 'at least 100% below the 1990 baseline year' (net zero Greenhouse Gas emissions) by 2050. This includes reducing emissions from Scotland, Wales and Northern Ireland. The Climate Change Act also requires the UK government to produce a National Adaptation Programme (NAP), setting out actions for government and others to adapt to the challenges of climate change in England over a five-year period. The devolved administrations produce their own programmes and policies.	The Plan should consider the full risks from climate change within the catchment to understand what the challenges and opportunities are in relation to water management, impacts of the water management processes and impacts on flood risk. The Plan should ensure that it can be achieved within the EA's annual carbon budgets, given that these are aligned with the carbon glidepath of the Paris Agreement and ensure net zero operations by 2050.	Climate and carbon, and Air Quality.
Build Back Better: our plan for growth (2021)	Policy paper from HM Treasury published March 2021. A publication setting out the government's plans to support economic growth through significant investment in infrastructure, skills and innovation. In creating	The Plan should support the objectives of the Build Back Better plan, in particular objectives to support the transition to Net Zero and regenerate struggling towns in all parts of the UK. The Plan should also support the vision for the UK to adapt to the risks	Population and Human Health, Climate and carbon and Infrastructure and Transport.

Appendix A – Plans, Programmes and Environmental Protection Objectives

Document name	Description	Relationship to the Plan	Links to SEA topics
	growth it also aims to drive levelling up of the whole of the UK, support the transition to Net Zero and support the vision for Global Britain.	posed by climate change, particularly in relation to flood risk.	
The Third National Adaptation Programme (2023)	The third National Adaptation Programme sets out how the UK will respond to the impacts of climate change from 2023 to 2028. The key actions are focused around protecting the natural environment, supporting business in adapting to climate change, adapting infrastructure, protecting buildings and their surroundings, protecting public health and communities and mitigating international impacts on the UK.	The Plan should support the objectives of the plan, in particular objectives to support the transition to Net Zero and regenerate struggling towns in all parts of the UK. The Plan should also support the vision for the UK to adapt to the risks posed by climate change, particularly in relation to flood risk.	Population and Human Health, Climate and carbon, Infrastructure and Transport and Resources and Waste.
The Marine and Coastal Access Act 2009	The Marine and Coastal Access Act 2009 is UK legislation that establishes the Marine Management Organization (MMO) responsible for marine functions. It defines the Exclusive Economic Zone (EEZ), introduces marine planning, and grants public access rights to the English coast. This act aims to promote marine conservation, sustainable development, and coastal access in the UK.	The Plan should be developed in line with the legislation that has been put in place by this act, specifically in relation to marine planning and conservation.	Biodiversity, Water environment and Infrastructure and transport (material assets).
Wildlife and Countryside Act 1981 (as amended)	The Wildlife and Countryside Act 1981 is a crucial piece of UK legislation for environmental conservation. It provides protection to native species, especially those at risk, and restricts the release of non-native species into the wild. Additionally, the act enhances the safeguarding of Sites of Special Scientific Interest (SSSIs) and builds upon the rights of way rules established in the National Parks and Access to the Countryside Act 1949.	The Plan should maintain the safeguarded status of SSSIs and should provide protection to native species.	Biodiversity
Conservation of Habitats and Species Regulations 2017	The Conservation of Habitats and Species Regulations 2017 consolidate and update previous legislation, including the 2010 regulations. These regulations aim to protect wildlife sites across mainland Britain and safeguard the species inhabiting those areas. Notably, they also implement aspects of the Marine and Coastal Access Act 2009.	The Plan should be in line with the updated regulations to protect wildlife and safeguard species inhabiting the areas impacted by the Plan.	Biodiversity
Protection of Badgers Act (1992)	The Protection of Badgers Act 1992 prohibits the deliberate killing, injuring, or capturing of wild badgers. It also prohibits interference with badger setts (and attempts to do so). The act aims to safeguard the welfare of badgers, a species that has faced persecution in the UK for many years	The Plan should further safeguard the welfare of badgers in the local area by not interfering with badger setts or populations.	Biodiversity

Appendix A – Plans, Programmes and Environmental Protection Objectives

Document name	Description	Relationship to the Plan	Links to SEA topics
State of Nature Report (2023)	The State of Nature 2023 report provides a comprehensive assessment of the UK's biodiversity. It draws on data from biological monitoring and recording schemes, collected by skilled volunteers. Key findings from the report cover; wildlife decline, insect decline, plant loss and marine impact.	The Plan should consider the findings of the Report and seek to address the specific areas of decline by enhancing biodiversity.	Biodiversity
UK Biodiversity Indicators 2023	The 2023 update of the UK Biodiversity Indicators, published on 14 November 2023, comprises updates to 18 indicators.	The Plan should consider the UK Biodiversity Indicators as areas in which the Plan can focus biodiversity enhancement.	Biodiversity
British Red Cross	*Every time it rains:* British Red Cross research on flooding in the UK is a report that highlights the critical issue of flooding in the UK, affecting millions and potentially doubling in risk by the 2050s. It emphasizes the urgent need for action to mitigate future climate-related flooding risks and to assist communities in adapting and preparing for such events. The study aims to understand the impact of flooding through the perspectives of those directly affected and experts in the field. It seeks to offer a platform for the voices of at-risk communities, outlining the primary challenges they encounter. The report proposes action priorities to enhance preparedness and resilience, enabling faster recovery from future flooding incidents.	The Plan should consider the research conducted by the British Red Cross and consider the action priorities in relation to preparedness and resilience.	Flooding
England and Wales			
The Environmental Permitting (England and Wales) (Amendment) Regulations 2018	This instrument amends the Environmental Permitting (England and Wales) Regulations 2016 to ensure that, on the UK's exit from the European Union EU, they remain fully operable. The Environmental Permitting Regulations (England and Wales) (2016) consolidate the system of environmental permitting in England and Wales, replacing the Environmental Permitting (England and Wales) Regulations 2010. They widened the existing environmental permitting and compliance system in England and Wales by integrating the existing permitting regimes covering pollution prevention and control and waste management licensing, water discharge consents, groundwater authorisations and radioactive substances regulation authorisations.	The Plan will adhere to Environmental Permitting Regulations and go beyond requirements by minimising environmental harm and harm to human health, whilst maximising environmental benefits and human health.	Population and Human Health, Biodiversity, Ground Conditions (Soils and Geology), Water Environment, Air Quality and Resources and Waste.
The Eels (England and Wales) Regulations (2009)	The Eels (England and Wales) Regulations 2009 lists provisions such as maintaining fish passes where rivers may be obstructed by dams or weirs and the provision of screens on outlets to avoid entrapment of fish.	The Plan will avoid creating obstructions to the passage of eels, and where appropriate look include opportunities to improve passage of eels within the Plan area.	Biodiversity, Water Environment and Infrastructure and Transport.

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Document name	Description	Relationship to the Plan	Links to SEA topics
Salmon and Freshwater Fisheries Act 1975 (as amended)	The Salmon and Freshwater Fisheries Act (SAFFA) is legislation that aims to protect freshwater fish, with a particularly strong focus on salmon (Salmo salar) and trout (Salmo trutta). The legislation covers a broad range of topics, but of particular relevance to development are those sections covering water pollution, habitat disturbance and fish migration routes. Under Section 2 (4) it is an offence to wilfully disturb spawn, spawning fish or spawning areas and under Section 4 (1) it is an offence to knowingly permit the flow of poisonous matter and polluting effluents into river courses that are poisonous or injurious to fish or the spawning grounds, spawn or food of fish. Sections 9 to 15 are concerned with fish passage and migration routes. It is the duty of the waterway owner that when constructing dams, screens or sluices to provide and maintain a facilitating fish pass for migrating salmon or trout.	The Plan will support the protection and conservation of freshwater fish through helping to improve water quality, habitat and reduce impacts of drought. The implementation of the Plan also has the potential to have adverse effects to freshwater fish during the construction and implementation of the scheme and should incorporate measures to avoid disturbance and adverse effects.	Biodiversity, Water Environment and Infrastructure and Transport.
The Wild Mammals (Protection) Act 1996	This Act confers specific protection on rare or threatened mammal species by protecting all wild mammals from any action intended to cause unnecessary suffering.	The Plan will seek to not cause adverse impacts to rare or threatened mammal species, and will look to incorporate measures to enhance habitats to support these species.	Biodiversity.
The Great Britain invasive non-native species strategy	Policy paper from the Department for Environment, Food and Rural Affairs, published in August 2015 and updated in February 2023. The strategy: • sets out the aims and actions for addressing the threats posed by invasive non-native species (INNS); • sets out a framework to deliver the most effective response to preventing, eradicating and managing invasive non-native species; and • aims to improve co-ordination and co-operation by: government, stakeholders, land managers and the general public against invasive non-native species, across Great Britain.	The Plan will incorporate measures to ensure the risk and spread of INNS is not increased through the catchment.	Biodiversity.
Climate change: Third national adaptation programme (2023 to 2028)	The National Adaptation Programme (NAP) sets the actions that government and others will take to adapt to the impacts of climate change in the UK.	The Plan should contribute to the actions and targets outlined in the NAP3. This includes helping to mitigate impacts to infrastructure from flooding and supporting restoration and enhancement of the natural environment to increase its resilience to the effects of climate change. For example, through	Population and Human Health, Biodiversity, Land use and Landscape, Cultural heritage, climatic factors and Air Quality.

Appendix A – Plans, Programmes and Environmental Protection Objectives

Document name	Description	Relationship to the Plan	Links to SEA topics
	The third National Adaptation Programme (NAP3) sets out the key actions for 2023 to 2028. This report forms part of the 5-yearly cycle of requirements laid down in the Climate Change Act 2008.	using nature-based solutions to help reduce society's vulnerability to climate risk and contribute to species recovery by providing more high-quality habitat for wildlife. The Plan should also help support health and well-being, and heritage actions outlined in the NAP3, such as through providing green infrastructure that can help reduce overheating and reduce flood risk to heritage assets.	
Planning (Listed Buildings and Conservation Areas) Act 1990	The Planning (Listed Buildings and Conservation Areas) Act is a UK Act of Parliament introduced in 1990 that changed laws relating to the granting of planning permission for building works, with a particular focus on listed buildings and conservation areas. It created special controls for the demolition, alteration or extension of buildings, objects or structures of particular architectural or historic interest, as well as conservation areas. This Act will be replaced by The Historic Environment (Wales) Act 2023 upon its enactment.	The Plan should be developed to ensure that it does not cause adverse impacts to listed buildings or conservation areas.	Cultural heritage.
The Historic Environment (Wales) Act 2023	The Ancient Monuments and Archaeological Areas Act 1979 defines 'scheduled monuments' (sites that warrant protection) and makes damage to scheduled monuments a criminal offence. This Act will be replaced by The Historic Environment (Wales) Act 2023 upon its enactment. The Historic Environment (Wales) Act 2023will replace The Ancient Monuments and Archaeological Areas Act 1979, The Historic Environment (Wales) Act 2016 and The Planning (Listed Building and Conservation Areas) Act 1990 upon its enactment. It will also lead to revisions to the Technical Advice Note 24: The Historic Environment 2017. The Act is a Consolidation Act and should not alter legislation.	The Plan should be developed to ensure that it does not cause adverse impacts to Scheduled Ancient Monuments.	Cultural heritage.
Water Resources Act 2003	The Act amends the Water Resources Act and Regulations 1991 and the Water Industry Act 1991, to capture the new era of management. The Act has the following four broad aims: • facilitate sustainable use of water resources and economic growth; • strengthening the voice of consumers a measured increase in competition; and • the promotion of water conservation.	The Plan should comply with the Water Resources Act and support the sustainable use of water resources through improving resilience to flooding within the catchment.	Population and Human Health, Water environment and Resources and waste.

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Document name	Description	Relationship to the Plan	Links to SEA topics
The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017	The EU Water Framework Directive (WFD)1 has been in force since 2000 and is currently the largest and most influential piece of EU legislation relating to the water environment. The Directive was transposed into UK law by The Water Environment (Water Framework Directive) (England and Wales) Regulations (2003, subsequently amended in 2015, 2016 and 2017) and the requirements of the WFD currently remain in place following Britain's exit from the EU in January 2021. The WFD aims to protect and enhance the quality of the water environment. It takes a holistic approach to the sustainable management of water by considering the interactions between surface water, groundwater and water-dependent ecosystems. The overall Environmental Objectives of the WFD are to: • prevent the deterioration in the status of aquatic ecosystems, protect them and improve the ecological condition of waters; • aim to achieve at least 'good' status for all water bodies by 2015. Where this is not possible and subject to the criteria set out in the Directive, aim to achieve good status by 2021 or 2027; • meet the requirements of Water Framework Directive Protected Areas; • promote sustainable use of water as a natural resource; • conserve habitats and species that depend directly on water; • progressively reduce or phase out the release of individual pollutants or groups of pollutants that present a significant threat to the aquatic environment; • progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants; and • contribute to mitigating the effects of floods and droughts. The WFD Regulations requires the current status of all water bodies to be classified and objectives be set for maintaining or improving status, so that all water bodies reach and/or maintain 'good' status by 2027 at the latest (subject to any exemptions). The Water Framework Directive (2000/60/EC) is transposed into UK law by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (the 'WFD'). It requires any proposed	The Plan should not cause deterioration of any WFD waterbody status or prevent waterbodies from achieving 'Good' status. The Plan should also contribute to the enhancement of WFD waterbodies, such as through implementing measures to restore rivers and improve water quality. A WFD compliance assessment will be undertaken as part of the Plan to show how project complies with the legislation. The findings of the WFD will be incorporated into the SEA.	Population and Human Health, Biodiversity, Land use and Landscape, Ground conditions (soil and geology), Water environment and Resources and waste.

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Document name	Description	Relationship to the Plan	Links to SEA topics
	developments with the potential to impact the water environment, to carry out a risk assessment to demonstrate the proposed development will not result in deterioration of status or prevent the water body from meeting the WFD objective. It is likely that future Plan projects will require a WFD risk assessment due to activities being undertaken on a main river and will likely be subject to a flood risk activity permit.		
The Urban Waste Water Treatment (England and Wales) Regulations 1994	This Regulation sets out how to regulate the disposal of sewage, transposing the EU Urban Waste Water Treatment Directive. It requires Defra to publish a situation report on urban wastewater and sludge disposal and assess compliance with these regulations.	The Plan should support wastewater treatment through helping to slow and retain water, reducing the volumes of surface water that is directed towards combined sewer systems during flood events. This can help reduce pressure on these systems and need to use combined sewage outflows to release untreated water into waterbodies.	Water environment and Resources and waste.
Control of Pollution Act 1974	This Act regulates waste disposal, water pollution, noise, atmospheric pollution, and public health; and for purposes connected with these matters. Part I of the Act controls waste on land and states that under the act (except in prescribed cases) a person shall not deposit, cause or knowingly permit the deposit of controlled waste on land. Part II, which relates to the entry of polluting matter into water, states that a person is guilty of offence if they permit toxic or solid waste matter entering streams without authorisation. Section 40 of the Act provides local authorities powers for controlling noise and vibration from development sites. Part IV relates to the prevention of atmospheric pollution.	The Plan should comply with the Control of Pollution Act. This includes ensuring that the waste and pollutants are managed and disposed of correctly and do not cause harm to the environment.	Population and Human Health, Biodiversity, Water environment, Air quality and Resources and waste.
The Flood Risk Regulations 2009	The regulation transposes the EU Floods Directive. Requiring the Environment Agency and local authorities to prepare flood risk assessment reports, flood hazard maps, flood risk maps and flood risk management plans. The Flood Risk Regulations 2009 legislation was revoked as part of the Retained EU Legislation Act on the 31 December 2023. This avoids duplication with the Flood and Water Management Act 2010.	The Plan should help manage and reduce flood risk in the Plan area. The strategy should utilise information prepared by NRW and local authorities, such as flood risk mapping and management plans, to help inform and guide the strategy to see that measures are effective and targeted to where they are most needed.	Population and Human Health, Water environment and Climate and carbon.
Flood and Water Management Act 2010	The Act provides for better flood risk management for people, homes and businesses, whilst also addressing the threat of water scarcity and	The Plan should comply with the requirements of the Act. The Plan should help better manage water in the catchment to help reduce risk of flooding to	Population and Human Health, Water environment and Climate and carbon.

Document name	Description	Relationship to the Plan	Links to SEA topics
	protecting the affordability of water drainage charges and protects water supplies to the consumer.	people, properties and infrastructure. The Plan should be developed in partnership with other risk management authorities to deliver flood risk management to better benefit communities.	
The Water Supply (Water Quality) (Amendment) Regulations 2016	Consolidate legislation concerning the quality of water supplies for human consumption in England. The regulations also apply to supplies in Wales where the water undertaker or licensee is primarily based in England.	The Plan should help implement measures to help improve water quality in the catchment and make water supply more resilient to the impacts of drought.	Population and Human Health, Biodiversity and Water environment.
The Hedgerow Regulations 1997	The Hedgerows Regulations 1997 protect important hedgerows by controlling their removal through a notification system. Whether or not a hedgerow is protected is dependant on criteria relating to length, location and 'importance'.	The Plan should adhere to the requirements outlined in the Hedgerow Regulations (1997).	Biodiversity and Land use and landscape.
Wales			
Equality Act 2010 (Statutory Duties) (Wales) Regulations 2021	The Equality Act 2010 legally protects people from discrimination in the workplace and in wider society, whilst increasing equality of opportunity. The Act sets out who is protected from discrimination (nine protected characteristics), the types of discrimination under the law and what action one can take if one feels unfairly discriminated against in a range of scenarios, for example, in relation to services, education, premises and employment. Section 149 of the Act sets out the Public Sector Equality Duty ('the Duty'). This requires that public bodies have due regard to the need to: • Eliminate discrimination, harassment, victimisation and any other conduct that is prohibited under the Act; • Advance equality of opportunity between persons who share a relevant protected characteristic and persons who do not share it; and • Foster good relations between persons who share a relevant protected characteristic and persons who do not share it. The specific Welsh duties also includes the requirement for engagement (Regulation 5), Equality Impact Assessments (Regulation 8) and also the socioeconomic disadvantage duty to reduce inequality of outcome (Section 45 of the Wales Act 2017 amends part one of the Equality Act, 2010 to include this consideration).	The Plan will map outcomes to ensure that benefits, disbenefits and unintended outcomes on all communities and vulnerable people within the catchment will be considered fairly.	Population and human health (communities).

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Document name	Description	Relationship to the Plan	Links to SEA topics
The Air Quality Standards (Wales) Regulations 2010	The ambient air quality standards and objectives are given statutory backing in Wales through the Air Quality Standard (Wales) Regulations 2010. These Regulations seek to control human exposure to pollutants in outdoor air to protect human health and the environment by requiring concentrations to be within specified limit values. These Air Quality Standards Regulations set 'limit values', 'target values' and 'long-term objectives' for ambient concentrations of the pollutants.	The Plan will adhere to the Air Quality Standards (Wales) Regulations, minimising air pollutions for the full lifecycle of interventions and their indirect impacts as well.	Population and human health (communities), Biodiversity and Infrastructure and transport (material assets).
The National Strategy for Flood and Coastal Erosion Risk Management in Wales (2020)	This is the second National Strategy on Flood and Coastal Erosion Risk Management (FCERM) for Wales, replacing the 2011 Strategy. It is prepared under the terms of the Flood and Water Management Act 2010.This Strategy sets out how Welsh Government intend to manage the risks from flooding and coastal erosion across Wales. It sets objectives and measures for all partners to work towards over the life of this document. The aim of the strategy is to reduce the risk to people and communities from flooding and coastal erosion. Five objectives are identified to achieve this. These are: • Improving our understanding and communication of risk; • Preparedness and building resilience; • Prioritising investment to the most at risk communities; • Preventing more people becoming exposed to risk; and • Providing an effective and sustained response to events.	The Plan should support the ambitions outlined in the National FCERM Strategy for Wales. This includes through increasing resilience of the Plan area to flooding, supporting the use of nature-based solutions, support sustainable growth, delivering biodiversity net gain and contribute to environmental net gain.	Population and human health (communities), Land use and landscape and Water environment.
Water Strategy for Wales (Welsh Government, 2015)	The Strategy sets out Welsh Government's long-term policy direction in relation to water. The aim is to ensure Wales have a more integrated and sustainable approach to managing water and associated services in Wales. The policies within the strategy relate to six themes: • Water for nature people and business; • Improving the way we plan and manage our water service; • Delivering excellent service to customers; • Protecting and improving drinking water quality; • 21st century sewerage and drainage system; and • Supporting delivery.	The Plan should support the approach to water management set out in the strategy, including through protecting and improving water quality and creating and improving spaces for recreation and community benefit.	Population and human health (communities), Water environment and Climate and carbon.

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Document name	Description	Relationship to the Plan	Links to SEA topics
The Environmental Damage (Prevention and Remediation) (Wales) Regulations 2009	Every year there are many thousands of cases of damage to the environment. The Regulations require action in response to the most significant cases, covering specific types of: • damage to species and habitats; • damage to water; or • risks to human health from contamination of land.	The Plan should comply with the Regulations and see that the scheme does not propose measures that would result in damage to species, habitats, water or human health.	Population and human health (communities), Biodiversity, Ground conditions (soil and geology), Water environment and Resources and waste.
Nature Based Climate Action Memorandum of Understanding (2015)	In December 2015, Welsh Government attended Conference of Parties (COP) 21 in Paris. This was part of the United Nations Framework Convention on Climate Change (UNFCCC). Along with other sub-national governments, Wales agreed a Nature Based Climate Action Memorandum of Understanding (MOU). Interest of issues for the parties include natural carbon stocks and sinks; Forests; Sustainable Land Management; Oceans and Ecosystem based adaptation. The MOU outlines specific actions and commitments that Wales will undertake. These relate to: • Linking ecosystem resilience and climate change adaptation and mitigation; • Natural or 'green' infrastructure solutions; • Promoting investments; and • Global responsibility.	The Plan should support the actions Wales has committed to within the MOU, including through promoting the use of natural or 'green' infrastructure solutions and promoting investment in landscape-scale projects.	Biodiversity, Lane use and landscape, Water environment, Climate and carbon and Infrastructure and transport (material assets).
Future Wales: The National Plan 2040	The National Plan 2040 outlines the Welsh Government's twenty year plan for shaping the future growth and development of Wales. The development plan includes a strategy for addressing key national priorities through the planning system including sustaining and developing a vibrant economy, achieving decarbonisation and climate resilience, developing strong ecosystems and improving the health and well-being of our communities. The plan sets out 11 goals for the next 20 years. These include: • A Wales where people live and work in connected, inclusive and healthy places that everyone can be a part of. • A Wales where places manage natural resources and reduce pollution. • A Wales where there are biodiverse, resilient and connected ecosystems.	The Plan should support the Welsh Governments National Plan. This includes through supporting growth in the identified national growth area of Cardiff, supporting sustainable growth, investing in infrastructure to mitigate the impacts of flooding, promoting the use of nature-based solutions, enhancing biodiversity, increase woodland cover and economic growth.	Population and human health (communities), Biodiversity, Land use and landscape, Water environment and Infrastructure and transport (material assets).

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Document name	Description	Relationship to the Plan	Links to SEA topics
	The plan supports "growth of the right things" i.e. development in town and city centres that supports people's health and well-being such as green infrastructure, and "more green infrastructure" to protect and enhance biodiversity. Plans should value and protect nature, find areas to protect or turn into places for ecosystems and include more green infrastructure. Policies include: • Policy 1 – Where Wales will grow • Policy 2 – Shaping Urban Growth and Regeneration – Strategic Placemaking • Policy 3 – Supporting Urban Growth and Regeneration – Public Sector Leadership • Policy 8 – Flooding • Policy 9 – Resilient Ecological Networks and Green Infrastructure • Policy 15 – National Forest • Policy 25 – Regional Growth Areas – Mid Wales • Policy 26 – Growing the Mid Wales Economy		
Climate Emergency (2019)	In April 2019, the Welsh Environment Minister declared a climate emergency in Wales. The declaration sends a clear signal that the Welsh Government will not allow the process of leaving the EU to detract from the challenge of climate change, which threatens Wales's health, economy, infrastructure and Wales's natural environment.	The Plan should help reduce the impact of climate change on the environment, society and the economy. It should also explore the use of low carbon alternatives and measures that sequester carbon (such as habitat creation) to help reduce carbon emissions associated with the scheme and its contribution to carbon budgets.	Population and human health (communities), Biodiversity, Land use and landscape, Climate and carbon and Infrastructure and transport (material assets).
Well-being of Future Generations Act (2015)	The Well-being of Future Generations Act 2016 focuses on improving the social, economic, environmental and cultural well-being of Wales. The Act sets out the following seven goals, and makes clear that the listed public bodies (including NRW and local authorities) must work to achieve all of them: • A Prosperous Wales – low carbon society, recognising planetary limits, efficient use of resources.	The Plan should support the goals outlined in the Future Generations Act. This should include incorporating measures to enhance the natural environment, support well-being and reducing inequalities, create safe communities and protect Welsh heritage.	All topics.

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Document name	Description	Relationship to the Plan	Links to SEA topics
	• A Resilient Wales – maintain and enhance biodiverse natural environment, healthy functioning ecosystems that support resilience and adaptability. • A More Equal Wales – fulfilled potential no matter the background or circumstances. • A Healthier Wales – physical and mental well-being maximised. • A Wales of Cohesive Communities – attractive, viable, safe and well-connected communities. • A Wales of Vibrant Culture and Thriving Welsh Language – promote and protect Welsh language, heritage and culture. • A Globally Responsible Wales – positive contribution to global well-being.		
Environment (Wales) Act (2016)	The Environment (Wales) Act 2016 requires the 'sustainable management of natural resources' and sets out a framework to ensure this is a core consideration in decision making, including the State of Natural Resources Report (SoNARR) and a Natural Resources Policy (NRP). The NRP sets three national priorities for managing Wales' natural resources: • Delivering nature-based solutions; • Increasing renewable energy and resource efficiency; and • Taking a place-based approach. The Environment (Wales) Act (2016) also sets a legal target of reducing greenhouse gas emissions in Wales by at least 80% in 2050. Section 6 and Section 7 Duty are included within the act provide guidance for maintaining and enhancing biodiversity. This Act will be replaced by The Historic Environment (Wales) Act 2023 upon its enactment.	The Plan should support the management of flood risk through an integrated approach to help achieve long-term sustainability. This should include increasing resilience to the effects of climate change. The project should also help reverse the decline of biodiversity and enhance ecosystems through providing biodiversity net gain.	Biodiversity, Land use and landscape, Climate and carbon and Resources and waste.
Wales Environment Act Section 6 and Section 7 Duty (2016)	The Wales Environment Act, which includes Section 6 Duty, emphasizes the responsibility of public authorities to maintain and enhance biodiversity. This duty is part of a broader legislative framework aimed at promoting the resilience of ecosystems in Wales. Public authorities are required to consider aspects such as diversity within ecosystems, connections between ecosystems, and the	The Plan should strongly consider it's "Biodiversity Duty" by implementing opportunities throughout to increase biodiversity in the local area. Additionally, The Plan should take reasonable steps to maintain and enhance living organisms and	Biodiversity, Water environment and Infrastructure and transport (material assets).

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	adaptability of ecosystems. This legislation reflects a commitment to environmental sustainability and the protection of natural resources. Section 7 states that 'The Welsh Ministers must prepare and publish a list of the living organisms and types of habitats which in their opinion are of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales.'	types of habitats included in any list published under Section 7.	
Climate Change (Interim Emissions Targets) (Wales) (Amendment) Regulations 2021	These Regulations make amendments to the Climate Change (Interim Emissions Targets) (Wales) Regulations 2018, which set the interim emissions targets under Part 2 of the Environment (Wales) Act 2016. The Act requires Welsh Ministers to meets target for reducing emissions of greenhouse gasses from Wales. In addition to increase the current 2050 target of 80% lower than the baseline to at least 100% ('net zero') (as outlined in The Environment (Wales) Act 2016 (Amendment of 2050 Emissions Targets), it increases the 2030 and 2040 interim targets to 63% and 89% respectively.	The Plan should contribute to helping Wales achieve its climate change targets through exploring the use of nature-based solutions and low carbon alternatives to help reduce emissions and sequester carbon.	Climate and carbon.
Planning Policy Wales (PPW) Edition 12 (Welsh Government, 2018)	Sets out the land use planning policies of the Welsh Government. The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales, as required by the Planning (Wales) Act 2015, the Well-being of Future Generations (Wales) Act 2015 and other key legislation and resultant duties such as the Socio-economic Duty. PPW themes include: • Strategic & Spatial Choices; • Active & Social Places; • Productive & Enterprising Places; and • Distinctive & Natural Places.	The Plan should adhere to the land use planning policies set out in the PPW. This should include protecting the environment and mitigating environmental impacts, supporting the creation of accessible and healthy environments, promoting economic activity and helping to unlocking land for development.	All topics.
Technical Advice Note 5: Nature Conservation and Planning (Welsh Government, 2009)	The Technical Advice Note (TAN) provides advice about how the land use planning system should contribute to protecting and enhancing biodiversity and geological conservation. This includes advice on sustainability appraisal and the SEA of development plans.	The Plan should implement best practice guidance outlines in the TAN to help ensure biodiversity is protected and enhanced. This includes providing biodiversity net gain and implementing measures to help species and habitats be more resilient to the effects of climate change.	Biodiversity, Water environment and Infrastructure and transport (material assets).

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Document name	Description	Relationship to the Plan	Links to SEA topics
Technical Advice Note 15: Development and Flood Risk (Welsh Government, 2004)	This TAN provides technical guidance which supplements the policy set out in Planning Policy Wales in relation to development and flooding. It advises on development and flood risk as this relates to sustainability principles, and provides a framework within which risks arising from both river and coastal flooding, and from additional run-off from development in any location, can be assessed.	The Plan should help reduce the impacts of flooding on at risk communities, infrastructure and development within the catchment. It should also incorporate measures to increase land available that is suitable for development, in line with the criteria and guidance outlined in the advice note.	Population and human health (communities), Water environment and Infrastructure and transport (material assets).
Technical Advice Note 16: Sport, Recreation and Open Space (Welsh Government, 2009)	This TAN provides technical guidance to supplement policy set out in PPW. It advises on the role of the planning system in making provision for sport and recreational facilities and informal open spaces, as well as protecting existing facilities and open spaces in urban and rural areas in Wales. This includes consideration of inland water features, such as rivers, canals, reservoirs and lakes.	The Plan should help increase provision and quality of accessible natural green open space and access to blue space, such as improving the quality of waterbodies so that these are more suitable for recreational activities.	Population and human health (communities), Biodiversity, Water environment and Infrastructure and transport (material assets).
Planning Policy Wales Technical Advice Note 24: The Historic Environment (2017)	The purpose of this TAN is to provide guidance on how the planning system considers the historic environment during development plan preparation and decision making on planning and Listed Building (LBC) applications. This TAN provides specific guidance on how the following aspects of the historic environment should be considered: • World Heritage Sites; • Scheduled monuments; • Archaeological remains; • Listed buildings; • Conservation areas; • Historic parks and gardens; • Historic landscapes; and • Historic assets of special local interest. This Technical Advice Note will be revised upon the enactment of The Historic Environment (Wales) Act 2023.	The Plan should implement best practice guidance outlined int the TAN to ensure heritage assets are protected and enhanced, including built assets, historic landscapes and buried archaeology.	Land use and landscape, Cultural heritage and Infrastructure and transport (material assets).
National Natural Resources Policy 2017	The focus of this Natural Resources Policy (NRP) is on improving the way Wales manage their natural resources. The three national priorities for the management of Wales's natural resources are: • Delivering nature-based solutions;	The Plan should adhere to the policies set out to help improve the management of natural resources in Wales. This should include through taking a place-based approach to delivering nature-based	Biodiversity, Land use and landscape, Climate and carbon, Infrastructure and

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	• Increasing renewable energy and resource efficiency; and, • Taking a place-based approach.	solutions and increasing renewable energy and resource efficiency.	transport (material assets) and Resources and waste.
The Nature Recovery Action Plan for Wales 2020 - 2021	The Nature Recovery Action Plan for Wales has been refreshed to take into account the growing evidence around the scale of the loss of biodiversity and the changing policy context in Wales. This includes the legislative framework and the Natural Resources Policy, the expected impacts of our exit from the EU, the escalating ecological crisis and the need to respond urgently to that alongside the response to the climate emergency. The refreshed plan has 5 themes for action: • Aligning the responses to the climate emergency with the biodiversity crisis; • Addressing the post EU exit funding gap for agri-environment measures; • Providing spatial direction for targeting action for biodiversity; • Improving the condition of the Protected Sites Network; and • Exploring new and sustainable funding mechanisms for biodiversity action.	The Plan should positively contribute to each of the objectives of the NRAP, including through embedding biodiversity in decision making, safeguarding species and habitats of principal importance, increasing resilience and restoring natural habitats, reducing pressure on habitats.	Biodiversity and Climate and carbon.
Woodland for Wales Strategy (Welsh Government, 2009)	The strategy outlines Welsh Government's vision and targets for Wales' trees, woodlands and forest. It is built around four strategic themes: • responding to climate change; • woodlands for people; • a competitive and integrated forest sector; and • environmental quality. The strategy acknowledges that woodlands and trees can contribute to water and soil management at a local and catchment level.	The Plan should consider the goals of this strategy when exploring afforestation interventions, ensuring that woodland creation is guided by the objectives in this strategy and by the need to protect semi-natural habitats, historic features and characteristic landscapes.	Population and Human Health, Biodiversity, Land use and Landscape , Geology and hydrogeology, Water environment and Resources and waste.
The UK Forestry Standard (5th Edition 2023) and UKFS Guidelines	This is a guidance document that sets out the UK government's approach to sustainable forestry, including standards and requirements, regulations and monitoring, and reporting.	The Plan should consider this standard in the development of interventions that involve forestry (either the creation or management of)	Biodiversity, Land use and Landscape, Geology and hydrogeology, Resources and waste.

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Document name	Description	Relationship to the Plan	Links to SEA topics
State of Natural Resources Report (SoNaRR) for Wales 2020	SoNaRR assesses Wales's sustainable management of natural resources and sets out a range of opportunities for action.	The Plan should contribute to help alleviate the key pressures identified in the SoNaRR whilst also contributing to opportunities identified.	Biodiversity, Land use and Landscape, Geology and hydrogeology, Resources and waste, Population and Health
Biodiversity deep dive: Recommendations: (Welsh Government, 2022)	This is a report prepared by the WG setting out the outcomes of the biodiversity deep dive (study) focussing on protecting at least 30% of the land and 30% of the sea by 2030. It sets out a set of collection actions that can be taken immediately to support the delivery of this goal. These include objectives for improving connectivity of habitats, protecting and enhancing designated landscapes, reforming land and marine management and embedding nature recovery in policy and strategy in public bodies in Wales.	The Plan objectives should not conflict with the objectives of this report	Biodiversity, Land use and Landscape, Geology and hydrogeology, Resources and waste, Population and Health
The National Peatland Action programme(NRW, 2020)	This is a 5 year plan (2020-2025) of peatland restoration in Wales. Welsh peatlands need urgent action to reverse habitat loss and their poor condition. They support a variety of habitats and species, and have an important role in: • capturing and storing carbon • regulating greenhouse gases • maintaining biodiversity • regulating water. • The Wales Environmental Information Portal contains the new peat map showing the locations of all Peatlands in Wales.	The programme will have direct and indirect benefit for the Plan in terms of mitigating and adapting to climate change. Where Plan measures are delivered downstream of NPAP projects opportunities could be identified to work together to align delivery and maximise benefits.	Biodiversity, Land use and landscape, Water Environment, Geology and Hydrogeology
Net Zero Wales Carbon Budget 2 (2021 to 2025)	This Net Zero Wales Plan represents outlines Wales' decarbonisation journey with a new net zero target. This Plan sets out 123 policies and proposals, alongside commitments and action across Wales. The polices are broadly set out under the following categories: • Across the UK • Electricity and heat generation • Transport • Residential buildings • Industry and business	The Plan should adhere to the policies set out in the Net Zero Wales Carbon Budget. In addition, the Plan should take into account the Climate Change Commission's latest Risk Independent Assessment.	Biodiversity, Land use and Landscape, Water environment, Infrastructure and transport (material assets) and Resources and waste.

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Document name	Description	Relationship to the Plan	Links to SEA topics
	• Agriculture • Land use, land use change & Forestry • Waste management • Public sector The Plan focuses on the second carbon budget (2021-2025) and also looks ahead to build the foundations for Carbon Budget 3, the 2030 target and net zero by 2050.		
NRW Corporate Plan to 2030 (NRW, updated 2024)	The NRW Corporate Plan sets out NRWs new well-being objectives and how they align with the well-being goals and therefore the statutory duty under the Well-being of Future Generations (Wales) Act 2015.	The Plan should work with the NRW well-being objectives by improving resilience to climate change, working to improve access to nature, facilitating nature's recovery and minimising pollution.	Population and Human Health, Biodiversity, Water environment, Climate and carbon and Resources and waste.
Historic Environment (Wales) Act 2023	The Historic Environment (Wales) Act 2023 aims to enhance accessibility to the law for various stakeholders, including owners and occupiers of scheduled monuments, listed buildings, third-sector groups, and public authorities. Although the act has received Royal Assent, it will not come into force until supporting secondary legislation has been made and guidance and administrative documents have been revised and updated to reflect its passage. It is expected that the Act will come into force in the latter part of 2024.	The Plan should adhere to the requirements outlined in the Historic Environment (Wales) Act (2023).	Cultural heritage.
Property Strategy for Employment in Wales 2004- 2008	The Property Strategy for Employment in Wales 2004-2008 sets out the Welsh Assembly Government's approach for employment sites and buildings across Wales. The document aims to provide a framework to ensure that Wales can provide high quality employment sites and premises in the right locations for inward investors and indigenous businesses. The strategy makes a number of site allocations including several Business Parks, Strategic and Strategic Mixed use sites, Office sites and Industrial Estates.	The Plan will map outcomes to ensure that any potential impacts on employment sites or sites designated as employment land within the catchment will be considered fairly.	Population and Human Health.
Llwbyr Newydd: the Wales Transport Strategy (2021)	The strategy sets out how the transport system in Wales can help deliver a more prosperous, green and equal society. It sets out nine mini-plans explaining how different transport modes and sectors can contribute to achieving this.	The Plan should support the objectives of the Wales Transport Strategy by helping to improve resilience against the impacts of climate change and encouraging connectivity between settlements within the catchment where possible.	Population and Human Health and Infrastructure and transport (material assets).

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Active Travel (Wales) Act 2013 (and Associated guidance, 2021)	The Act facilitates the delivery of high-quality active travel networks that enable more people to regularly walk and cycle for utility journeys instead of using a car. It requires local authorities to have regard to integrated network and to take reasonable steps to enhance the provision made for walkers and cyclists. The guidance provides the mandate for the delivery of these high quality active travel networks and schemes that maximise the benefits from the investment being made to active travel infrastructure.	The Plan should seek to deliver opportunities such as designing in multi-user paths onto flood embankments.	Infrastructure and transport (material assets), population and health.
Minerals Planning Policy Wales 2001	The Minerals Planning Policy Wales sets out land use planning policy guidance of the National Assembly for Wales in relation to mineral extraction and related development in Wales. The policy does not specify specific locations for mineral extraction and contains strong policies in relation to the protection of European Designated Sites. The policy operates on five key principles, comprising: • Provide mineral resources to meet society's needs and to safeguard resources from sterilisation; • Protect areas of importance to natural or built heritage; • Limit the environmental impact of mineral extraction; • Achieve high standard restoration and beneficial after-use; and • Encourage efficient and appropriate use of minerals and the re-use and recycling of suitable materials.	The Plan should support the policies set out in the Minerals Planning Policy Wales, specifically the ambitions to protect areas of importance to natural or built heritage and encourage efficient and appropriate use of minerals and the re-use and recycling of suitable materials.	Biodiversity, Land use and landscape, Cultural heritage, Geology and hydrogeology and Resources and waste.
Welsh National Marine Plan (WNMP) 2019	The aim of the plan is to support the sustainable development of the Welsh marine area by contributing across Wales's well-being goals, supporting the Sustainable Management of Natural Resources (SMNR) through decision making and by taking account of the cumulative effects of all users of the marine environment.	The Plan should take into consideration opportunities to enhance the tourism potential of the catchment by preserving and enhancing the natural and historic environment. Particular emphasis should be placed on the intersection of catchments with the Cardiff local planning authority boundary	Population and human health (communities), Biodiversity and Cultural heritage.
Marine Area Statement (Welsh Government, 2017)	Covering the inshore waters of Wales extending out 12 nautical miles and making up 43% of the Welsh territory, the NRW Marine Area Statement aims to achieve the following: • Support work that can help to reconnect people with Welsh seas.	The Plan should support the objectives and themes set out in the Marine Statement, in particular supporting the resilience of marine ecosystems.	Water environment, Geology and hydrogeology, Population and health and Biodiversity

Document name	Description	Relationship to the Plan	Links to SEA topics
	• Engage at a local level to explore what people in Wales value about the country's coasts and seas. • Work more closely through Public Service Boards to identify and address marine and coastal issues and opportunities. • Raise the profile of marine and coastal areas and their role in supporting local well-being.		
The Severn Estuary Shoreline Management Plan 2 (SMP2).	The SMP2 provides a large-scale assessment of the risks (to people, property, the natural and historic environment) associated with coastal erosion and flooding at the coast over the long-term. It also proposes policies to help manage these risks sustainably over the next hundred years.	The Plan should consider how it contributes to the aims and objectives set out for Cardiff Area in particular. These high-level objectives include: • To manage the risk of flooding to people and property; • To manage the risk of flooding to key community, recreational and amenity facilities; • To manage the risk of flooding to industrial, commercial and economic assets and activities, including tourism and agriculture; • To seek to minimise the impact of policies on marine operations and activities; • To manage the risks of flooding and erosion to critical infrastructure; • To allow natural processes and to maintain the visibility of geological exposures throughout geological SSSIs; • To maintain the integrity of internationally designated sites and the favourable condition of their features; • To manage adverse impacts on nationally designated conservation sites; • To enhance nationally designated conservation sites, where practical; • To manage the risk to scheduled sites and other internationally, nationally, regionally and locally important cultural	Biodiversity, Population and human health (communities), Geology and soils, Water environment, Cultural heritage, Land use and landscape

Document name	Description	Relationship to the Plan	Links to SEA topics
		historic environment sites and their setting.	
Planning (Wales) Act 2015	The Planning (Wales) Act aims to reform the planning system in Wales, to ensure that it is fair, resilient and enables development. The Act notes that Local Development Plans must promote sustainable development in accordance with the Well-being of Future Generations (Wales) Act 2015. The Act sets out a series of legislative changes to deliver reform of the planning system in Wales, to ensure it is fair, resilient and enables development. The Act addresses 5 key objectives: • A modernised framework for the delivery of planning services: the Act introduces powers to allow planning applications to be made directly to Welsh Ministers in limited circumstances; • Strengthening the plan led approach: the Act introduces a legal basis for the preparation of a National Development Framework and Strategic Development Plans; • Improved resilience: the Act will allow the Welsh Ministers to direct local planning authorities to work together and for local planning authorities to be merged; • Frontloading and improving the development management system: the Act will introduce a statutory pre-application procedure for defined categories of planning application; and • Enabling effective enforcement and appeals: the Act enables changes to enforcement procedures to secure prompt, meaningful action against breaches of planning control and increase the transparency and efficiency of the appeal system.	The Plan should support the policies set out in the Planning (Wales) Act 2015 and work to improve resilience within the catchment and limit any adverse impacts to the natural or historic environment.	All topics.
July 2021 guidance document "Building Better Places"	This document sets out the Welsh Government's planning policy priorities to assist in taking action in the recovery period after the coronavirus pandemic. These policies are centred around the outcomes set out in the Planning Policy Wales document, comprising: • Creating and sustaining communities. • Growing the economy in a sustainable manner. • Making best use of resources.	The Plan should seek to limit its own environmental impact, whilst supporting the use of green infrastructure solutions such as Natural Flood Management (NFM).	All topics.

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	• Maximising environmental protection and limiting environmental impact. • Facilitating accessible and healthy environments. The key issues derived from these policies are outlined as: • Staying local: creating neighbourhoods; • Active travel: exercise and rediscovered transport methods; • Revitalising our town centres; • Digital places – the lockdown lifeline; • Changing working practices: our future need for employment land; • Reawakening Wales's tourism and cultural sectors; • Green infrastructure, health and well-being and ecological resilience; and • Improving air quality and soundscapes for better health and well-being.		
Public Health (Wales) Act 2017	The provisions of the Act aim to address a number of specific and current public health concerns, and to create social conditions that are conducive to good health, where avoidable harms can be prevented. It deals with obesity, tobacco and nicotine products, special procedures (acupuncture, body piercing, electrolysis, tattooing), intimate piercing, health impact assessments, pharmaceutical services, and toilets for public use. The Act prescribes Local Authorities (amongst others) as enforcement bodies for the Act. It requires the production of a national strategy on preventing and reducing obesity and for key decisions to be subject to Health Impact Assessment.	The Plan should see that the scheme adheres to the provisions set out in the Public Health (Wales) Act 2017.	Population and human health (communities).
Prosperity for All: A Low Carbon Wales, 2019	This plan sets the foundations for Wales to transition to a low carbon nation; setting out the Welsh Government's approach to increasing efficiency and cutting emissions of greenhouse gasses by at least 80% by 2050. This is vital to meet the requirements of the Environment (Wales) Act 2016, thereby contributing to a fairer and healthier society.	The Plan should incorporate and contribute towards improved climate resilience.	Population and human health (communities) and Climate and carbon.
Water Act 2014	The Water Act 2014 is legislation relating to water resources.		Water environment (water resources)

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Natural Resources Wales Flood Risk Management Plan: National overview	Natural Resources Wales (NRW) is tasked with identifying flood-prone areas through assessments and creating corresponding hazard and risk maps from 2023-2029. The Flood Risk Management Plans (FRMPs) detail strategies and actions to address identified risks, adhering to the regulations. The latest FRMP adopts a Wales-wide perspective, differing from the previous cycle's River Basin District scale, and continues collaboration with the Environment Agency for cohesive water management. This plan aims to prioritize efforts in the most vulnerable communities, guided by the Communities at Risk Register, ensuring targeted and effective flood risk management. An SEA was produced for the Flood Risk Management Plan.	The primary flood risk issues and the climate change risks identified in this plan should be taken into account. The Plan should pay particular regard to the communities identified as most at risk from flooding.	Water environment (flooding), Climate
Civil Contingencies Act 2004	The Civil Contingencies Act 2004 is designed to improve emergency preparedness and response. It establishes roles for local responders, dividing them into Category 1 (core responders like emergency services and local authorities) and Category 2 (co-operating bodies like utility companies). These responders work together in local resilience forums to coordinate efforts. The Act also provides a framework for emergency powers, allowing special legislative measures during severe emergencies. It modernizes the definition of "emergency" to include contemporary risks such as terrorism and environmental hazards, ensuring a comprehensive approach to civil protection.	The Plan should consider ensuring that the measures ensure coordinated efforts between core responders and cooperating bodies to ensure a comprehensive and effective flood emergency response.	Water environment (flooding)
Socio-economic Duty	The Socio-economic Duty, effective from 31 March 2021 in Wales, aims to enhance decision-making processes and outcomes for the socio-economically disadvantaged. It provides statutory guidance for public bodies to fulfil the Duty's requirements, promoting innovative and varied approaches.	The Plan should prioritise inclusive decision-making to ensure that the needs of socio-economically disadvantaged communities effectively considered.	Health and population
Public Health Wales Health Impact Assessment on climate change	This HIA indicates the main health and wellbeing impacts of climate change in Wales, and specifies which health determinants could be affected and which vulnerable groups may experience adverse outsized impacts.	The Plan should consider how climate change is impacting population health and wellbeing in Wales.	Health and population
LANDMAP, Landscape and a Changing Climate	LANDMAP is an interactive map which includes five nationally consistent, quality assured spatial datasets: geological landscape, landscape habitats, visual and sensory, historic landscape and cultural landscape services. LANDMAP maps and classifies landscapes from the unique perspective of each dataset, describes key characteristics, evaluates their importance, recommends locally appropriate	The Plan should utilise LANDMAP's datasets to inform and guide landscape-specific flood prevention and response strategies	Water environment (flooding)

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	management guidelines, and identifies significant landscape change through monitoring of the baseline resource.		
The Action Plan for Pollinators in Wales	The Action Plan for Pollinators in Wales is a strategic initiative by the Welsh Government to address the decline in pollinator populations, which are crucial for the pollination of crops and wildflowers. The plan outlines a vision and specific actions to improve conditions for pollinators, with the aim of halting and reversing their decline. The plan identifies key concerns such as habitat destruction, disease, agro-chemicals, and climate change, and sets out a framework for action in response to these challenges.	The Plan should incorporate strategies to protect and enhance pollinator habitats to mitigate the impacts of flooding on these crucial ecosystems.	Ecology and biodiversity, water environment (flooding)
Historic Environment and Climate Change Sector Adaptation Plan (February 2020)	The document addresses the impact of climate change on Wales's historic environment, emphasizing the need for adaptation to protect irreplaceable historic assets.	The Plan should prioritise adaptation strategies to safeguard irreplaceable historic assets from the impacts of climate change.	Climate
Tranquillity and Place mapping	NRW developed a resource to map visually tranquil places in Wales, considering both rural and urban areas. It found that 67% of Wales is in the top 3 most visually tranquil categories, with Snowdonia and Gower AONB having the highest percentages. This map can be used to inform policy, planning, and conservation efforts to enhance well-being and quality of life.	The Plan should look to develop strategies to improve water conservation and quality in response to climate change impacts.	Setting
Dark Skies and Light Pollution in Wales	Dark Sky mapping demarcates areas by levels of light pollution. More than two thirds of Wales falls into the darkest category defined within the data.	The Plan should look to implement measures that reduce light pollution while promoting health benefits of dark skies.	Light Pollution
Transport for Wales, Climate adaptation and resilience plan	The plan addresses the need for climate adaptation and resilience in response to the increasing impacts of climate change on Wales' transport network. It focuses on creating a transport network in Wales that can cope with and recover from climate change hazards, reducing inequality and climate injustice.	The Plan should enhance public transportation infrastructure to be resilient against extreme weather and reduce carbon emissions through renewable energy.	Climate
Dŵr Cymru Reports	The Dŵr Cymru Reports include water resource plans, a drought plan, a Drainage and Water Management Plan and a Climate Change Adaptation report. Waste resource plans: The plans assess the ability to supply sufficient water from 2020 to 2050, identifying risks and solutions	• The Plan should promote sustainable water usage, encourage water conservation, and invest in infrastructure to protect water resources from climate change effects.	Water environment (water resources)

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	Drought Plan: Sets out how drought conditions within both the urban and rural parts of the supply area will be dealt with, as well as how the effect of actions taken on the natural environment will be monitored. Drainage and Wastewater Management Plan: The plan outlines a strategic approach to wastewater services, focusing on sustainability, customer needs, and collaborative efforts with stakeholders. Climate Change Adaptation report: The report outlines the impacts of climate change on Welsh Water's operations and the necessity for adaptation and mitigation strategies.		
UK Climate Risk Independent Assessment (CCRA3)	The third UK Climate Change Risk Assessment (CCRA3) has identified a significant number of risks and opportunities arising from climate change in Wales. Out of 61 identified factors, 32 require more immediate action, while only five are currently being addressed adequately. The assessment highlights that the natural environment is both at risk and could benefit from climate change, necessitating more action or further investigation in four key areas. Since the last assessment five years ago, the urgency of 26 risks has increased, with only one risk decreasing in urgency. This underscores the evolving nature of climate-related challenges and the need for proactive measures to mitigate these risks and capitalize on potential opportunities.	The Plan should address the significant number of climate risks and opportunities identified, prioritizing immediate action for the most urgent risks and investigating key areas further.	Climate
River Basin Management Plan Overview Wales	The document outlines the framework for managing the water environment in Wales, emphasizing sustainable use and improvement of water resources. The document discusses geomorphology and hydromorphology in the context of managing the water environment in Wales. Hydromorphology refers to hydrological and geomorphological processes and attributes of surface water bodies. It includes the form and function of the channel, its connectivity, and flow regime, which are crucial for maintaining natural sediment transport and aquatic organism migration. Many water bodies exhibit manmade changes that can alter natural flows, increase erosion, and reduce habitat diversity, constraining the physical nature of water bodies, with resulting ecological effects.	The Plan should outline a framework for sustainable water resource management, emphasizing geomorphology and hydromorphology to maintain natural sediment transport and aquatic organism migration.	Water environment (water resources)

A.1.3 Regional plans, programmes and protection objectives

Table A.3 Regional plans, programmes and protection objectives

Document name	Description	Relationship to the Plan	Links to SEA topics
South Central Wales			
South Central Wales Area Statement	Area Statements outline the key challenges facing that particular locality, what can be done to meet those challenges, and how-to better manage natural resources for the benefit of future generations. The role of the Area Statement is to coordinate existing measures and enable new initiatives. South Central Wales Area Statement outlines five themes. These are: • Building resilient ecosystems - protection and improvement of the resilience of ecosystems to enhance the benefits they provide and preventing the loss of biodiversity. The main challenges are climate change, and biodiversity loss as a result of inappropriate land management, pollution, unsustainable development and invasive species. There is a focus on protecting unique local ecosystems like ffridd, which connect various species and provide multiple benefits • Connecting people with nature - improving the way our natural resources and the benefits they afford us, are valued; • Working with water - protection, management and enhancement of water environments in South Central Wales. South Central Wales has high-quality water environments that have largely recovered from industrial neglect, yet still face pressure from urbanisation and climate change. A more integrated management approach is needed to enhance their resilience and benefits, and to achieve future goals of building resilient ecosystems, connecting people with nature, and integrating nature based solutions to address environmental challenges and improve wellbeing. • Improving our health - improving health and well-being through social, cultural, political, economic and environmental factors; and • Improving our air quality - protecting ecosystem resilience to assist with improving air quality. Each theme outlines what success would look like and outlines further opportunities to and projects to deliver the themes.	The Plan should help to deliver the themes outlined in the South Central Wales Area Statement by avoiding adverse impacts on sites of nature conservation importance and working to enhance water environments in South Central Wales.	Population and Human Health, Biodiversity, Land use and Landscape, Cultural heritage, Ground conditions (soil and geology), Water environment, Air quality and Resources and waste.

Appendix A – Plans, Programmes and Environmental Protection Objectives

Document name	Description	Relationship to the Plan	Links to SEA topics
	There are six ecosystem profiles:coastal, freshwater, grassland, peatlands, the valley hills, woodlands and urban.		
South Central Ecosystem Profiles: Freshwater	The document provides an overview of the freshwater ecosystems in the South Central region, including their current status, key species, and conservation efforts. Priorities within the profile include the maintenance and improvement of freshwater ecosystem health, biodiversity conservation, water quality management, and community engagement through involving local communities in conservation efforts.	The Plan should prioritise habitat enhancement projects, sustainable forestry practices, community involvement, and conservation education to enhance forest resources and ecosystems.	Ecology and biodiversity
South Central Wales Forest Resource Plans (NRW, 2024)	There are forest resource plans for all of Wales which are core management documents used by the Welsh Government's Woodland Estate. They lay out proposals for the future management of woodlands in accordance with policy and practice. They have a strong emphasis on delivering social, economic, and environmental benefits, incorporating the ecosystem approach to land management. Lower Taff and The Vale Forest Resource Plan, which references 12 woodlands in Rhondda Cynon Taff, the Vale of Glamorgan and Cardiff. Most of the woodlands are in a setting that is either improved agricultural grassland, native broadleaved woodland, and urban centres. The objectives of the plan include evolving the forest structure, maintaining and enhancing the landscape value of the forest, reduction the risk of wildfires, and maintaining and building ecosystem resilience.	The Plan should adopt holistic management strategies that consider ecological, economic, and environmental benefits within both National Forests and Woodlands.	Ecology and biodiversity
NRW Flood Risk Management Plan 2 (FRMP2)	The second cycle Flood Risk Management Plan is a plan to manage significant flood risks in the key areas across Wales over the next six years (2023-2029). The relevant plan is the South Central Wales FRMP which sets out a number of priorities for managing flood risk and identifies the areas most at risk of flood.	The Plan should take into consideration the main flood risk issues and the climate change risks identified in this plan. The Plan should pay particular regard to the communities identified as most at risk from flooding.	Infrastructure and transport (material assets), Population and human health (communities) (communities), Water environment.
Taff and Ely Catchment			
Taff and Ely Catchment Flood Management Plan - Environment Agency (2010)	The Taff and Ely Catchment Flood Management Plan assesses how the risk of flooding is currently managed and identifies key areas at risk of flooding within the catchment and, as well as the projected influence of climate change on this. The plan separates the catchment into smaller areas in order to effectively develop actions to improve flood resilience.	The Plan should take into consideration the main flood risk issues and changes and the climate change risks identified in this plan. The interventions propose within the plan should be considered and adopted where appropriate.	Population and human health (communities), Biodiversity, Water environment and Climate and carbon.

Appendix A – Plans, Programmes and Environmental Protection Objectives

Document name	Description	Relationship to the Plan	Links to SEA topics
Taff and Ely Opportunity Catchment	The Opportunity Catchment initiative in South Central Wales aims to address the challenges identified in the South Wales Central Freshwater ecological resilience assessment. The focus is on restoring ecological resilience in the face of nature and climate emergencies, ensuring a healthy and resilient freshwater environment for both nature and local communities. The approach includes building on identified opportunities and addressing pressures that reduce catchment resilience, such as aging infrastructure, urban pollution, flood risks, and the impacts of new developments. The Taff/Ely Opportunity Catchment, in particular, seeks to foster resilient relationships and partnerships to explore innovative methods for catchment restoration on a significant scale, enhancing water quality and supporting biodiversity within the freshwater ecosystems.	The Plan should take into consideration the aims of the Taff and Ely Opportunity Catchment and seek to enhance catchment restoration where possible.	Population and human health (communities), Biodiversity, Water environment and Climate and carbon.
South East Valleys Abstraction Licensing Strategy (November 2017)	The Licensing Strategy outlines the management of water resources within the river catchments of the South East Valleys. It details the availability of water for abstraction and offers insights into the potential reliability of securing a new abstraction license.	The Plan should consider the South East Valleys Licensing Strategy to ensure it is able to secure a new abstraction license.	Land use and Landscape, Ground conditions (soil and geology) and Water environment.
National Infrastructure Commission Wales (NICW) – Flood mitigation	NICW provides advice to the Welsh Government regarding the long-term infrastructure needs of Wales. Relevant reports include: -Renewable energy -Flood mitigation -Existential climate threats	The Plan should focus on managing flood risks, ensuring resilient recovery of infrastructure assets, and maintaining sustainable climate thresholds.	Water environment
Coal Tip Safety (Welsh Government, 2024)	The Welsh Government and its partners are delivering a programme of work. This includes inspection and maintenance of coal tips. It also includes developing new policy and legislation.	The Plan should include a comprehensive program for inspecting and maintaining coal tips, along with developing new policies and legislation to ensure safety.	
Severn River basin			
Severn River Basin Management Plan: Updated 2022	River Basin Management Plans (RBMP) are developed for each river basin every six years, in accordance with the river basin management planning cycle. The plans set out the current status and status objectives of each water body, together with the pressures affecting the water environment and a programme of measures and actions needed to achieve the objectives. The Environment Agency (EA) andNRW are the competent regulatory authorities responsible for implementing the WFD	The Plan should incorporate measures to help meet the challenges highlighted in this water management plan. This includes implementing measures to help tackle the climate emergency and biodiversity crisis, restore rivers to remove or reduce impacts of physical modifications, reduce pollution from agriculture, wastewater,	Land use and Landscape, Ground conditions (soil and geology) and Water environment.

Appendix A – Plans, Programmes and Environmental Protection Objectives

Document name	Description	Relationship to the Plan	Links to SEA topics
	Regulations and developing the RBMPs in England and Wales, respectively.	urban areas and mines, and help maintain flows. Interventions outlined in the programme of measures should be incorporated to help achieve the environmental objectives for waterbodies in the catchment.	

A.1.4 Local plans, programmes and protection objectives

Table A.4 Local plans, programmes and protection objectives

Document name	Description	Relationship to the Plan	Links to SEA topics
Cardiff			
Cardiff Local Well-being Plan 2023 to 2028	This is Cardiff's second Well-being Plan, covering the period 2023-2028. The Well-being Plan sets out the Cardiff PSB's priorities for action over the next 5 years, focusing on the areas of public service delivery which fundamentally require partnership working between the city's public and community services, and with the citizens of Cardiff. The latest iteration of the plan seeks to manage recovery and renewal from the Covid-19 pandemic; ensuring population growth and economic success benefits all citizens; reducing the inequity gap between the city's most and least deprived; meeting the needs of a growing older population; responding to increasing demands on health and social services; and urgently making the systemic changes needed to mitigate the impacts of climate change and decarbonise the city.	The Plan should support the goals of the Cardiff Well-being Plan, including incorporating measures to enhance the natural environment, support well-being and reducing inequalities, create safe communities and protect against the impacts of climate change.	Population and Human Health, Biodiversity, Land use and Landscape, Cultural heritage, Water environment, Climate and carbon, Air quality, Infrastructure and transport (material assets) and Resources and waste.
Cardiff Local Development Plan 2006-2026	The Cardiff Local Development Plan 2006-2026 aims to provide over 40,000 new homes and 40,000 new jobs within this period. The scale and rate of growth is expected to be in line with the Wales Spatial Plan. Of the new homes to be provided, approximately 65% will be located on brownfield sites and 35% on greenfield sites. The Local Development Plan also sets out an approach to provide new infrastructure, including sustainable transport solutions to reduce reliance on cars. The plan aims to deliver sustainable development by meeting social and economic needs in a managed way which retains, manages and enhances important features of the natural and built heritage.	The Plan should be consistent with the local planning policies set out in the Cardiff Local Development Plan and incorporate measures to support the delivery of the vision and objectives outlined in the plan. Themes in the plan of particular relevance to the Plan are the aims to retain, manage and enhance the important features of the natural and built heritage of Cardiff. The Plan should also take into account the location of allocated sites designated within the local plan.	All topics.
Cardiff's Transport White Paper: Transport Vision to 2030	Cardiff's Transport White Paper aims to tackle the climate emergency, reduce congestion, and improve air quality. It proposes projects to significantly improve public transport in Cardiff and the region, including expanding current Metro plans to deliver more new tram/train routes and stations; introducing new bus rapid transit services and Park & Ride sites; lowering bus fares; delivering safer walking and cycling routes; and travel options designed to get people out of their cars.	The Plan should adhere to the principles established in the White Paper and work to improve the resilience of transport networks within the catchment to flooding.	Population and human health (communities), Water environment and Infrastructure and transport (material assets).

Appendix A – Plans, Programmes and Environmental Protection Objectives

Document name	Description	Relationship to the Plan	Links to SEA topics
Cardiff Local Biodiversity Action Plan (LBAP) 2008	The CCl executive meeting of 4th December 2008 resolved that the document 'Wild About Cardiff' be replaced with the Cardiff Local Biodiversity Action Plan 2008. It gives a brief outline of the LBAP system, wildlife protection, biological recording, and the Cardiff resource (the presence/extent/distribution of habitats and species). Habitat Action Plans (HAPs), Species Action Plans (SAPs) and Generic Action Plans are explained and attached in appendices. The LBAP forms part of a package of documents and databases that evidence and describe Cardiff's biodiversity resource, together with setting out measures for its conservation, management and enhancement.	The Plan should adhere to the measures set out in the LBAP.	Biodiversity, Flora & Fauna
One Planet Cardiff - Our Vision for a Carbon Neutral City by 2030	One Planet Cardiff presents a strategic response to the climate emergency. Climate Change is already shaping our lives. We are living in a climate emergency with stark warnings and evidence globally that urgent action is needed if we are to avert the dangers ahead. Our One Planet Cardiff Strategy proposes a wide range of ambitious actions that will begin to form the basis of a delivery plan to achieve Carbon Neutrality. It aims to do this in a way that supports new green economies and greater social wellbeing in the city. The vision includes two key goals: • Council Carbon Neutrality – The Council aims to be carbon neutral in its activities by 2030. • City-Wide Carbon Neutrality – Collaborating with stakeholders to develop a pathway for a carbon neutral city by 2030. The strategy supports green economies and social well-being while addressing urgent climate challenges.	The Plan should support the delivery of the key goals as part of the wider vison of One Planet Cardiff.	Climatic Factors
Cardiff Councils Corporate Plan 'Delivering a Stronger, Fairer, Greener Cardiff'	Five-year policy programme which sets out priorities for the city, as well as objectives and timelines through which to accomplish them. Some of the objectives include supporting young people, supporting older people, supporting people out of poverty, safe, confident and empowered communities, economic growth and regeneration, promoting sustainability, and modernising and integrating public services.	The Plan should set out a strategic approach for managing the coastline from coastal flooding and erosion risks, aiming to reduce risks to people, developed areas, and natural environments over the next century.	All topics.
Cardiff Councils Clean Air Report	This document reviews and assesses air quality in Cardiff while identifying and addressing exceedances, as well as providing a framework for local authorities to take action to improve air quality and public health.	The Plan should evaluate Cardiff's air quality, pinpoint areas of concern, and establish a framework for local authorities to enhance air quality and safeguard public health.	Air quality

Appendix A – Plans, Programmes and Environmental Protection Objectives

Document name	Description	Relationship to the Plan	Links to SEA topics
Cardiff Council Shoreline Management Plan	Shoreline management plans set out a shared strategic approach for managing the coastline from coastal flooding and erosion risks. Their aim is to reduce the risks to people, the developed, historic and natural environments over the next century.	The Plan should propose a strategic method for managing coastal flooding and erosion, aiming to protect people, infrastructure, and natural habitats over the next century.	Water environment
Technical Advice Note 15 (TAN15): development, flooding and coastal erosion	This Technical Advice Note (TAN) provides guidance on managing flooding and coastal erosion risks in Wales, supplementing Planning Policy Wales (PPW). Key principles include environmental protection, accessible environments, and sustainable communities.	The Plan should offer guidance on addressing flooding and coastal erosion in Wales, focusing on environmental protection, creating accessible environments, and building sustainable communities.	All topics.
Cardiff Transport Strategy (2017)	This document explains: • How plans for improving Cardiff's transport system are needed to support the development of new sustainable communities envisaged within the Local Development Plan; • the main transport issues and challenges which we are working to address; our transport priorities and key proposals for improving the transport system.	The Plan should outline strategies for improving Cardiff's transport system to support sustainable community development as envisaged in the Local Development Plan	Transport
Cardiff's Transport White paper: Transport Vision to 2030	The White Paper suggests expanding tram-train routes, introducing Bus Rapid Transit services, and prioritizing walking and cycling as a way to alleviate stress on Cardiff's overwhelmed transport system.	The Plan should suggest expanding tram-train routes, introducing Bus Rapid Transit services, and prioritizing walking and cycling to alleviate stress on Cardiff's transport system.	Transport
Cardiff Biodiversity and Resilience of Ecosystems Duty Forward Plan (September	The Biodiversity and Resilience of Ecosystems Duty (BRED) Forward Plan is a document produced by CC in accordance with the Environment (Wales) Act 2016. It comprises two main components: the Green Infrastructure Plan and the BRED Action Plan. The Green Infrastructure Plan outlines CC's strategy for creating interconnected green spaces that serve multiple functions, from providing public open spaces to supporting wildlife and contributing to the city's economy, health, and community well-being. The plan emphasizes a holistic approach to managing parks, open spaces, and other natural elements to achieve a range of benefits, including ecological enhancement, climate change mitigation, economic growth, and improvements in public health and social inclusion. The document also details six strategic objectives	The Plan should emphasize a holistic approach to managing parks, open spaces, and other natural elements to achieve ecological enhancement, climate change mitigation, economic growth, and public health improvements.	Ecology and biodiversity

Document name	Description	Relationship to the Plan	Links to SEA topics
	aimed at maximizing these benefits and reinforcing Cardiff's unique character and sense of place. The BRED Action Plan emphasises integrating biodiversity and ecosystem resilience into the council's functions through active engagement with various service areas.		

Table of Abbreviations

Abbreviation	Definition
AQMA	Air Quality Management Area
BDPE	Brominated diphenylether
BEIS	Department for Business, Energy, and Industrial Strategy
CC	Cardiff Council
CCW	Countryside Council for Wales
CO	Carbon Monoxide
DCWW	Dŵr Cymru Welsh Water
EC	European Council
FCERM	Flood and Coastal Erosion Risk Management
FRMP	Flood Risk Management Plan
FRMSAP	Flood Risk Management Strategy and Action Plan
FWMA	The Flood and Water Management Act 2010
GWQN	Groundwater Quality Network
LAQM	Local Air Quality Management
LAQM	Local Air Quality Management
LFRMS	Local Flood Risk Management Strategy
LLFA	Lead Local Flood Authority
LNR	Local Nature Reserves
LPA	Local Planning Authority
NLCA	National Landscape Character Areas
NLCA	National Landscape Character Areas
NRW	Natural Resources Wales
ONS	Office for National Statistics
PAH	Polyaromatic hydrocarbons
RIGS	Regionally Important Geodiversity Sites
RMAs	Risk Management Authorities
SAC	Special Areas of Conservation
SEA	Strategic Environmental Assessment
SEWCUS	South East Wales Conjunctive Use System
SINC	Sites of Importance for Nature Conservation

Abbreviation	Definition
SPA	Special Protection Area
SSSI	Sites of Specific Scientific Interest
UK	United Kingdom
UXO	Unexploded Ordnance
WCA	The Wildlife and Countryside Act 1981
WFD	Water Framework Directive
WHS	World Heritage Sites
WIMD	Welsh Index of Multiple Deprivation
WWII	World War Two

1. Baseline Context

1.1 Introduction

The SEA Directive requires 'relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme' to be outlined, and 'the environmental characteristics of areas likely to be significantly affected' identified (SEA Directive Annex I (b) and (c)).

The existing baseline has been reviewed for the Plan area (Cardiff unitary boundary). Baseline conditions for areas located outside of the catchment boundaries are noted where they are of particular relevance. For example, areas located downstream and outside the Plan area that may be impacted by changes to flood risk resulting from activities of the Plan.

Cardiff is the largest and capital city of Wales. Cardiff is located in the southeast of Wales as shown in Figure 1. The County of Cardiff is situated between the councils of Newport to the east and Vale of Glamorgan to the west and the councils of Rhondda Cynon Taff and Caerphilly to the north.

Three rivers pass through the county, the Rhymney to the east which flows into the Bristol Channel and the River Taff and River Ely in the west which flow into Cardiff Bay. The three river catchments of the River Ely, River Taff, and River Rhymney are shown in Figure 2.

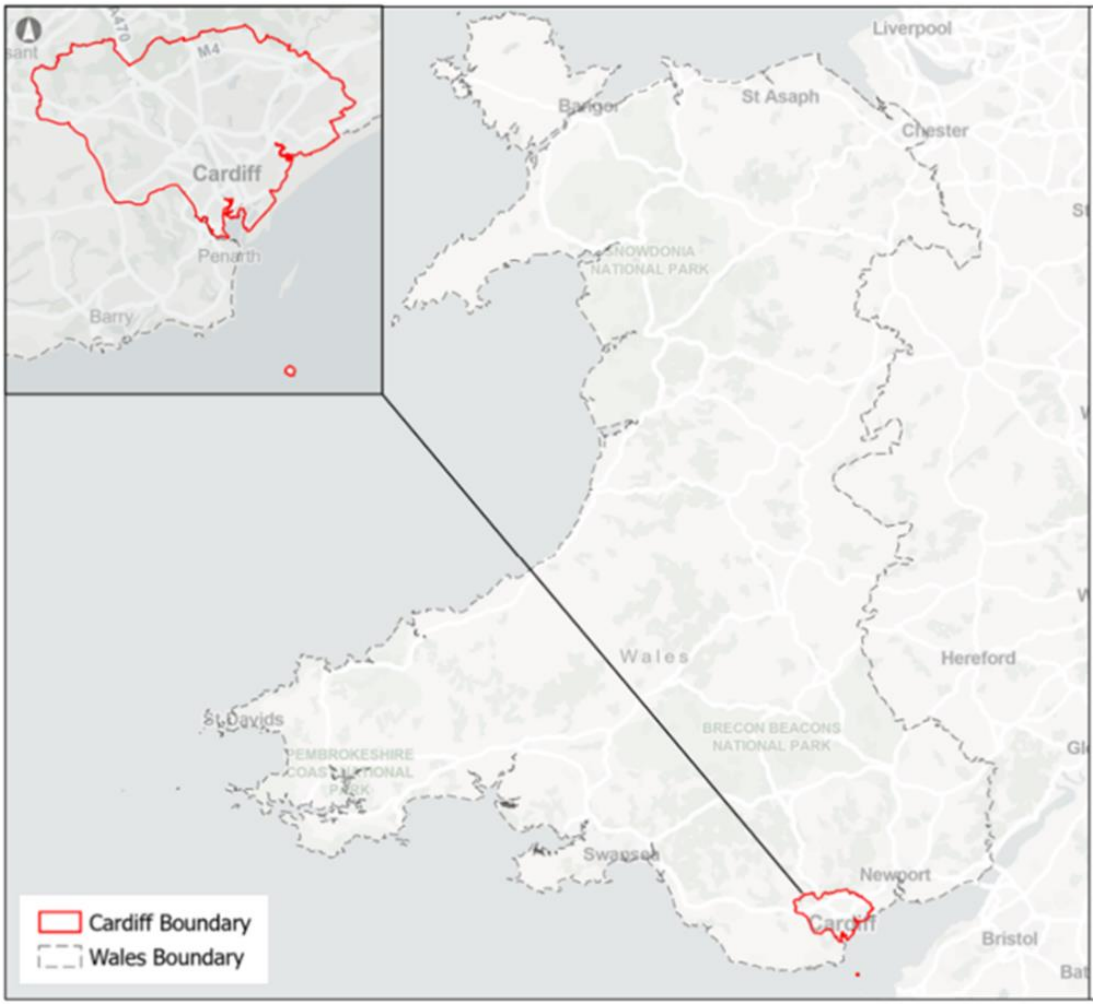

Figure 1 Location of Cardiff in Wales

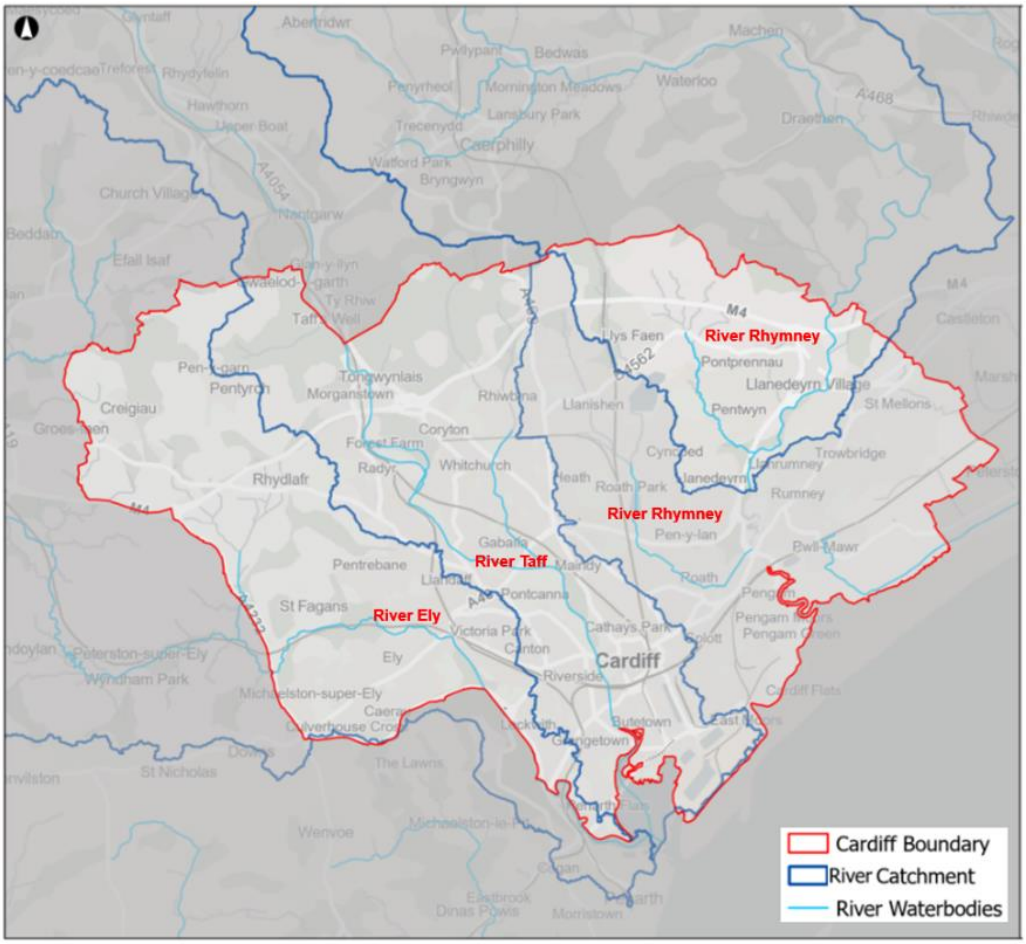

Figure 2: Cardiff Catchments Overview

1.2 Biodiversity, Flora & Fauna

1.2.1 Baseline Information

This section outlines the different statutory and non-statutory designations in place for biodiversity, flora and fauna in Cardiff. The information in this section is primarily taken from DataMapWales[1] and Magic Map[2]. This is in accordance with Section 6 Duty (Environment (Wales) Act 2016)[3], which mandates that public authorities 'seek to maintain and enhance biodiversity in the exercise of functions in relation to Wales, and in so doing promote the resilience of ecosystems, so far as consistent with the proper exercise of those functions'.

1.2.1.1 Special Areas of Conservation (SAC)

Special Areas of Conservation (SAC) in Wales are designated areas aimed at conserving biodiversity by protecting a wide range of habitats and species of animals and plants[4]. As of 2022, there are two SACs within the Plan area which are Cardiff Beech Woods and The Severn Estuary (Wales)[5]. Cardiff Beech Woods contains one of the largest concentrations of Asperulo-fagetum beech forest in Wales and represents

[1] DataMapWales. [Online] Available at: Home | DataMapWales (gov.wales)

[2] Magic Map. [Online] Available at: Magic Map Application (defra.gov.uk)

[3] Welsh Government. [Online] Available at: https://www.gov.wales/section-6-biodiversity-and-resilience-ecosystems-duty-summary-report-2022-html#:~:text=The%20duty%20places%20biodiversity%20as,to%20create%20healthy%20functioning%20ecosystems.

[4] JNCC. Special Areas of Conservation (SACs). [Online] Available at: https://jncc.gov.uk/our-work/special-areas-of-conservation/#sac-network-summary

[5] Natural Resources Wales (2022). Special Areas of Conservation (SACs). [Online] Available at: https://datamap.gov.wales/layers/inspire-nrw:NRW_SAC

a habitat near the western boundary of its range in both the UK and Europe. The Severn Estuary is a large estuary with extensive intertidal mudflats and sandflats, rocky platforms and islands, hosts a large variety of habitats.

1.2.1.2 Special Protection Area (SPA)

The Severn Estuary was classified as a Special Protection Area (SPA) as it was identified as having national and international importance for breeding, feeding, wintering and migration of rare and vulnerable species of birds, covering nearly 25,000 ha of the Estuary[6]. The intertidal mudflats and sandflats, saltmarsh, shingle, and rocky shore habitats bordering the Estuary are also protected within the SPA, as they support the protected bird species.

1.2.1.3 Ramsar Site

The Severn Estuary was also designated as a Ramser site in 1995, covering around 17,000 ha of wetland[7]. The Plan area's qualifying interest features overlap with those of the Severn Estuary SPA and SAC. The Plan area is especially significant for hosting internationally important populations of several species of waterbirds, as well as its fish species migrating between the sea and rivers via the Estuary.

1.2.1.4 Sites of Special Scientific Interest (SSSI)

Sites of Special Scientific Interest (SSSI) are areas that are protected for their biological or geological features, and they are designed under the Wildlife & Countryside Act 1981 (WCA). There are 17 SSSI located in CC. List of SSSIs in CC and the features are shown in Table 1 against the Plan area in Figure 3.

Table 1 SSSIs in Cardiff

SSSI	SSSI id	Type
Caeau Blaen-bielly	3122	Biological
Castell Coch Woodlands and Road Section	209	Mixed
Coed y Bedw	866	Biological
Ely Valley	991	Biological
Fforestganol a Chwm Nofydd	504	Biological
Flat Holm	570	Mixed/M
Garth Wood	1011	Biological
Glamorgan Canal / Long Wood	52	Biological
Gwent Levels – Rumney	1122	Biological
Lisvane Reservoir	1067	Biological
Llanishen and Lisvane Reservoir Embankments	2506	Biological
Penylan Quarry	853	Geological
Rhymney River Section	109	Geological

[6] Association of Severn Estuary Relevant Authorities (ASERA). The Severn Estuary SAC. [Online] Available at https://asera.org.uk/severn-estuary/sac/

[7] Association of Severn Estuary Relevant Authorities (ASERA). The Severn Estuary Ramsar Site. [Online] Available at https://asera.org.uk/severn-estuary/ramsar/

SSSI	SSSI id	Type
Rumney Quarry	479	Geological
Severn Estuary	461	Biological/M
Ton Mawr and Taffs Well Quarries	2601	Geological
Ty Du Moor	1623	Biological

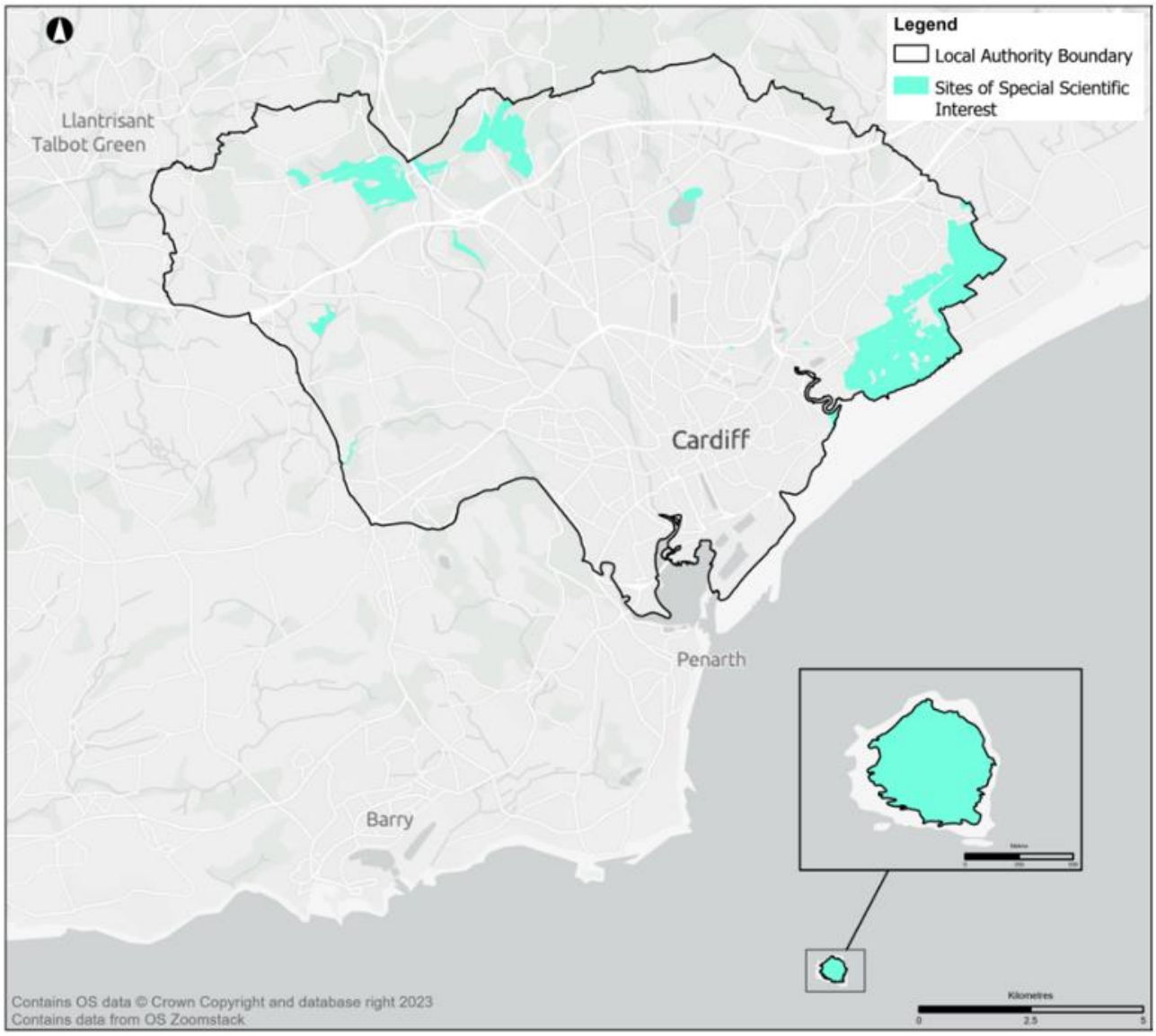

Figure 3 Sites of Special Scientific Interest (SSSIs) in Cardiff

1.2.1.5 Local Nature Reserves (LNRs)

Local Nature Reserves are established and managed by local authorities, in consultation with Natural Resources Wales (NRW), in accordance with the National Parks and Access to Countryside Act 1949. The purpose of a LNR is to protect both habitats and wildlife and enhance public awareness of the environment. There are 6 LNRs[8] within Cardiff listed in Table 2 and shown against the Plan area in Figure 4.

[8] Local Nature Reserves (LNR). [Online] Available at: https://datamap.gov.wales/layers/inspire-nrw:NRW_LNR

Table 2 LNRs in Cardiff

LNR	LNR id
Cardiff Bay Wetlands and Hamadryad Park	15.15 ha
Cwm Nofydd and Fforest Ganol	52.93 ha
Glamorganshire Canal	34.9 ha
Hermit Wood	1.47 ha
Howardian	11.15 ha
Nant Fawr Corridor	19.79 ha

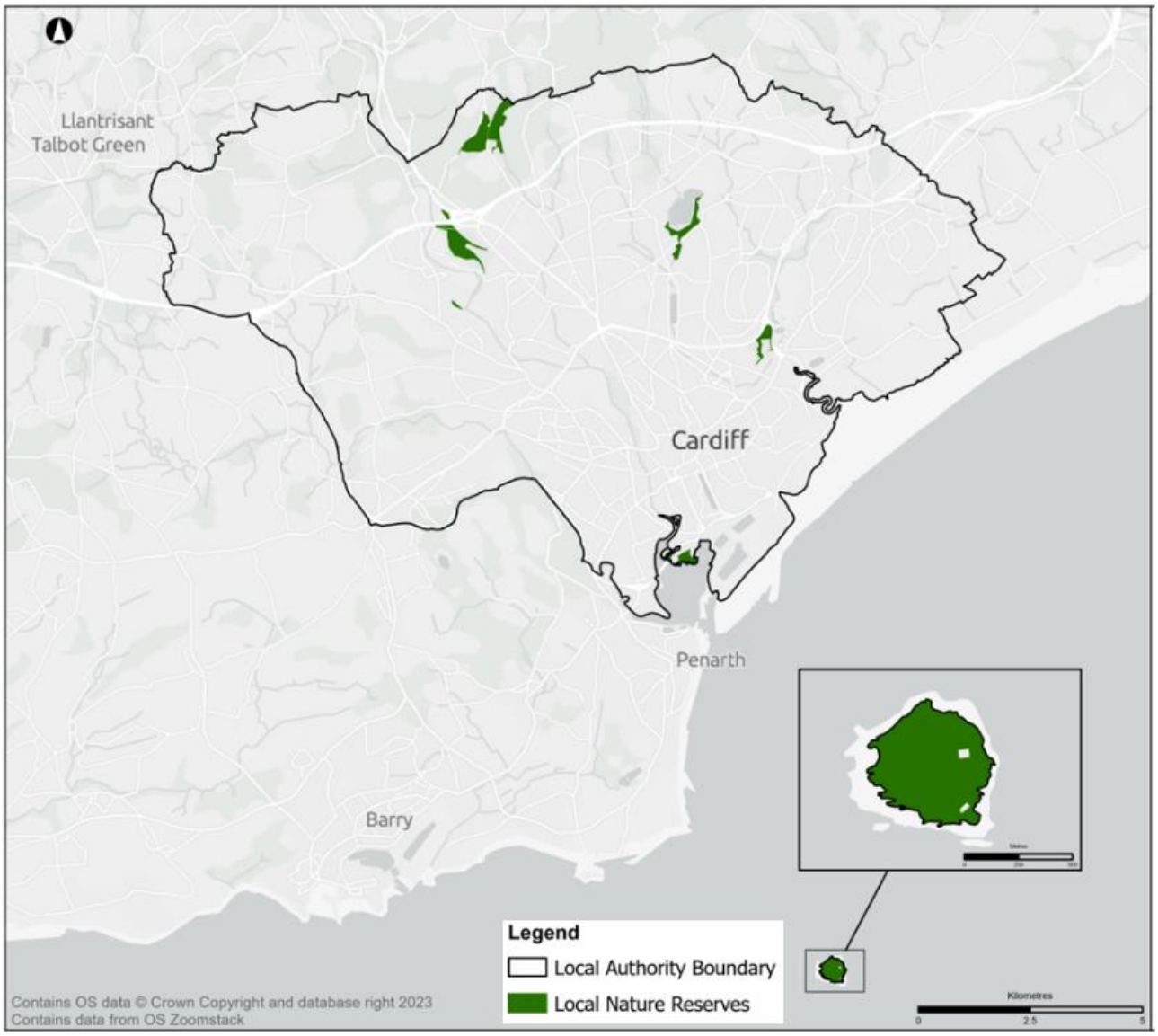

Figure 4 Local Nature Reserves (LNRs) in Cardiff

1.2.1.6 Wildlife Trust of South Wales and West Wales Nature Reserves

The Wildlife Trust of South and West Wales owns and manages 110 nature reserves covering 2,007 ha with the mission of rebuilding biodiversity and engaging people with their environment[9]. There is one Wildlife Trust of South Wales and West Wales nature reserve in the Plan area, which is Coed y Bedw located near Pentyrch, north-west of Cardiff. Coed y Bedw is an ancient broadleaved woodland which is situated across the boundary between acidic and calcareous soils which gives way to various woodland types and supports an assemblage of invertebrates[10].

1.2.1.7 Sites of Importance for Nature Conservation (SINC)

SINCs are locally important sites that are of high biodiversity value because of the habitats and species present. Although they are not legally protected, these sites will be of substantial nature conservation value and have an important role to play in meeting biodiversity targets and contributing to landscape-scale benefits for wild fauna and flora[11].

According to the Cardiff Adopted Local Development Plan 2006 – 2026, there are 181 SINCs within the local authority area[12].

1.2.1.8 Nature Networks (Resilient Ecological Networks)

RENs are defined as: 'networks of habitat in good ecological condition linking protected sites and other biodiversity hotspots across the wider landscape, providing maximum benefit for biodiversity and well-being. Such nature networks have existing or potential for healthy resilient ecosystems which provide a range of important ecosystem services as well as allowing the movement of species across landscapes in response to climate change'.**Error! Bookmark not defined.** Four Nature Networks (RENs) within Cardiff have been i dentified following the NRW Practitioners Guide to Resilient Ecological Networks[13], these are:

- Cardiff City
- North Cardiff Woodlands
- Gwent Levels
- Ely Catchment

1.2.1.9 Geological Sites

Regionally Important Geodiversity Sites (RIGS) are sites that are non-statutory but are chosen to safeguard significant areas related to geology, geomorphology, and soils. These sites complement the network of legally designated SSSIs. RIGS are selected based on their scientific, educational, historical, and aesthetic features. According to Planning Policy Wales, Planning Authorities should prioritise the protection of the specific features and qualities for which RIGS have been designated. When considering proposed developments, the impact will vary depending on the nature of the RIGS feature, making early consultation

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[9] Wildlife Trust of South and West Wales (2024). About Us. [Online] Available at: https://www.welshwildlife.org/about-us

[10] Wildlife Trust of South and West Wales. Coed y Bedw – Pentyrch. [Online] Available at: https://www.welshwildlife.org/nature-reserves/coed-y-bedw-pentyrch

[11] Bannau Brycheiniog. Sites of Importance for Nature Conservation and Local Wildlife Sites. [Online] Available at: https://www.beacons-npa.gov.uk/planning/wild-env-protection/protected-sites/sites-of-importance-for-nature-conservation-and-local-wildlife-sites/

[12] Cardiff Council (2016). Conservation Areas Map. [Online] Available at: https://www.cardiffldp.co.uk/wp-content/uploads/Constraint-Plan.pdf

[13]Natural Resources Wales (2021): Terrestrial and freshwater Resilient Ecological Networks: a guide for practitioners in Wales https://naturalresources.wales/guidance-and-advice/environmental-topics/land-management/practitioners-guide-to-resilient-ecological-networks/?lang=en

with the local RIGS group or NRW highly advisable[14]. Table 3 shows all the RIGS located in Cardiff and Figure 5 shows their geographical location within the Cardiff local area boundary.

Table 3 RIGS in Cardiff

RIGS	RIGS ID	RIGS	RIGS ID
Bwlch y cwm Quarry	613	Great Plymouth Wood	657
Castel Coch Quarry	634	Gwaelod y Garth	799
Cefn Garw Quarry	635	Lesser Garth Cave	568
Coedbychan Quarry	654	Radyr Quarry (Part I)	787
Craig Gwilym	605	Radyr Quarry (Part II)	787
Craig Llanishen	681	St y Nyll	655
Creigiau Quarry	662	Taff Well Quarry	666
Fforest Fawr	675	Thornhill Road	688
Garth Hill	741	Tongwynlais	630
Garth Wood Mine	566		
Garth Wood Mine and Quarry	566		
Georgetown	588		

[14] Natural Resources Wales (2023). Regionally Important Geodiversity Sites (RIGS). [Online] Available at: https://www.data.gov.uk/dataset/4b7156aa-a26c-4cf8-860d-a3af4ebd0384/regionally-important-geodiversity-sites-rigs

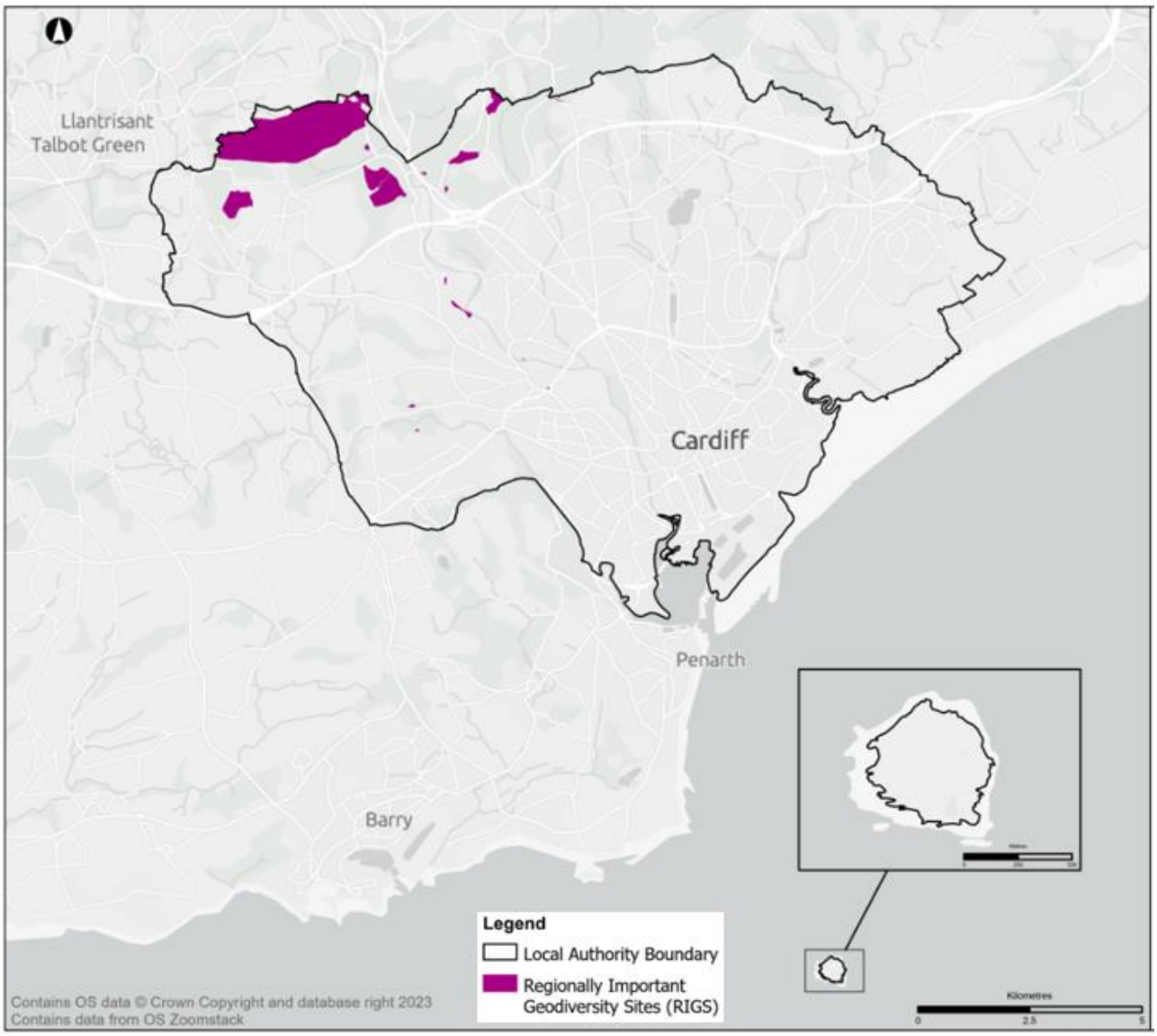

Figure 5 Regionally Important Geodiversity Sites (RIGS) in Cardiff

1.2.1.10 Local action

Within the Cardiff area, specific action is being taken to improve ecological resilience and nature regeneration. Some of these actions include working toward National Park City status, increasing tree cover, and committing to sustainable water management and urban greening in Cardiff. Examples of local action include the Cardiff Local Nature Partnership and Coed Caerdydd. The Cardiff Local Nature Partnership is involved with creating a nature recovery network across Wales, working to engage decision-makers, businesses and communities in action, and planning to protect and enhance green and blue spaces. The Cardiff Local Nature Partnership intends to draft a Nature Recovery Action Plan for Cardiff by Autumn 2024, with a final version published by March 2025. Coed Caerdydd is a 10-year program designed to significantly increase the tree cover in Cardiff as part of the city's broader One Planet climate change strategy[15].

Existing projects such as Sustainable Urban Drainage Systems (SUDs) exemplify the city's commitment to sustainable water management. For example, the Greener Grangetown initiative implemented rain gardens that capture and clean rainwater, diverting it directly into the River Taff, removing over 40,000m^3 of

[15] Outdoor Cardiff Online: Available https://www.outdoorcardiff.com/biodiversity/coed-caerdydd/what-is-coed-caerdydd/#:~:text=Coed%20Caerdydd%20is%20a%2010,places%20for%20nature%20and%20communities

rainwater annually from the combined sewer network[16]. Building on this success, Dŵr Cymru Welsh Water (DCWW) is planning further work to expand these initiatives, reinforcing the commitment to sustainable water management and urban greening in Cardiff.

1.2.2 Protecting Blue Spaces

1.2.2.1 Marine diversity

There is a diverse range of fish species in Cardiff, including those listed under Section 7 Species from the Environment (Wales) Act 2016, such as the Brown Trout, European Eel, and Atlantic Salmon.[17]

1.2.2.2 Invasive Non-Native Species (INNS) and biosecurity

The American Mink, having escaped from fur farms, has become a prevalent species in the UK. It is frequently found along all the rivers in Cardiff, preying on numerous waterbirds, and has significantly contributed to the decline of the Water Vole population which is now likely extinct. Terrapins have been introduced to various locations in Cardiff, such as Roath Park Lake and Cardiff Bay. The Zebra Mussel has recently colonised Cardiff Bay, likely attached to the hull of a boat.

Non-native flora can also have negative impacts. For example, Japanese Knotweed and Himalayan Balsam are prevalent in Cardiff's river valleys where they can outperform native plants. Ornamental pond plants can also become invasive if introduced into natural ponds and ditches. Notable examples include Water Fern and Parrot's Feather, the latter found in Heath Park Pond, and New Zealand Pygmy Weed, which has colonised a pond in Thornhill.

Cardiff Council (CC) monitors non-native species via the Cardiff Biological Database and actively manages Japanese Knotweed where it's problematic. Efforts are underway to manage non-native aquatic plants, such as Parrot's Feather in Heath Park. Cardiff Bay is the focus of a Mink control initiative and a study on the Zebra Mussel to mitigate their impact.

Crayfish plague is a highly infectious disease that affects crayfish, particularly the native white-clawed crayfish in Cardiff and other parts of the UK. It is caused by the water mould *Aphanomyces astaci*, which was introduced to Europe through the North American signal crayfish. To stop the transmission of crayfish plague and other biosecurity threats, it is crucial for individuals engaging in activities in or near water bodies to follow biosecurity measures such as the "Check, Clean, Dry" protocol. This involves inspecting equipment and attire for any soil and plant remnants, cleaning thoroughly, and ensuring they are entirely dry prior to entering other water areas[18].

1.2.2.3 Geomorphology

Geomorphology refers to hydrological and geomorphological processes and attributes of surface water bodies. It includes the form and function of the channel, its connectivity, and flow regime, which are crucial for maintaining natural sediment transport and aquatic organism migration. Protections and restoration of geomorphology is essential to building the resilience of ecosystems. Approaches to protection and restoration include The Ely Partnership and River Restoration Plans.

NRW has been leading progression of a whole catchment solution to water resource management in the River Ely catchment. This is referenced by Cardiff PSB's Local Wellbeing Plan Annual Report 2023/24 as opportunity to deliver greater benefits to both nature and people. The Ely Partnership completed a Natural Capital Assessment in its effort to work towards catchment wide benefits.

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[16] InterCardiff (2021) Online: Available: https://cardiffjournalism.co.uk/intercardiff/science-environment/cardiffs-new-drainage-system-will-tackle-surface-runoff-increase-biodiversity

[17] DataMapWales (2022) Online: https://datamap.gov.wales/layergroups/geonode:nrw_terrestrial_sections_7_habitats#:~:text=Under%20the%20Environment%20(Wales)%20Act,of%20the%20NERC%20Act%202006.

[18]Outdoor Cardiff - Biodiversity of Cardiff: Online: Available: https://www.outdoorcardiff.com/wp-content/uploads/Biodiversity-Booklet.pdf

1.3 Population & Human Health

1.3.1 Baseline Information

This section describes the baseline population and human health environment of Cardiff and how it relates to the rest of Wales.

1.3.2 Population

Population Structure

This section summarises some key results of the 2021 Census for England and Wales.

In 2021 the population size of Cardiff was 362,300[19]. This is an increase of 4.7% since 2011 where the population size was just under 346,100[1]. This was higher than the percentage population change for Wales which was 1.4%. Cardiff's population saw the second-greatest increase in Wales, behind Newport. In 2021, Cardiff ranked first for total population out of all local authority areas in Wales, maintaining the same position it held a decade ago. Cardiff was the most densely populated area out of all 22 local authority areas in Wales with about 150 residents per square kilometre in 2021[20].

The median age of Cardiff increased from 33 to 34 between 2011 and 2021. This was the lowest median age for any local authority area in Wales. In 2021 the largest age group in Wales was those aged 55-59 years. Between 2011 to 2021, there was an increase of 17.7% in people aged 65 years and over, a decrease of 2.5% in people aged 15 to 64 years, and a decrease of 1.0% in children aged under 15 years.

The age distribution and population structure in Cardiff in 2021, as shown in Figure 6, is similar to Wales, however, Cardiff has seen a greater increase in the proportion of people aged 5 to 14 years and a greater decrease in people over 70 between 2011 and 2021[22].

[19] Office for National Statistics (2021) Census 2021. [Online]. Available at: https://www.ons.gov.uk/visualisations/censusareachanges/W06000015/

[20] Office for National Statistics (2022). How the population changed in Cardiff: Census 2021. [Online] Available at: https://www.ons.gov.uk/visualisations/censuspopulationchange/W06000015/

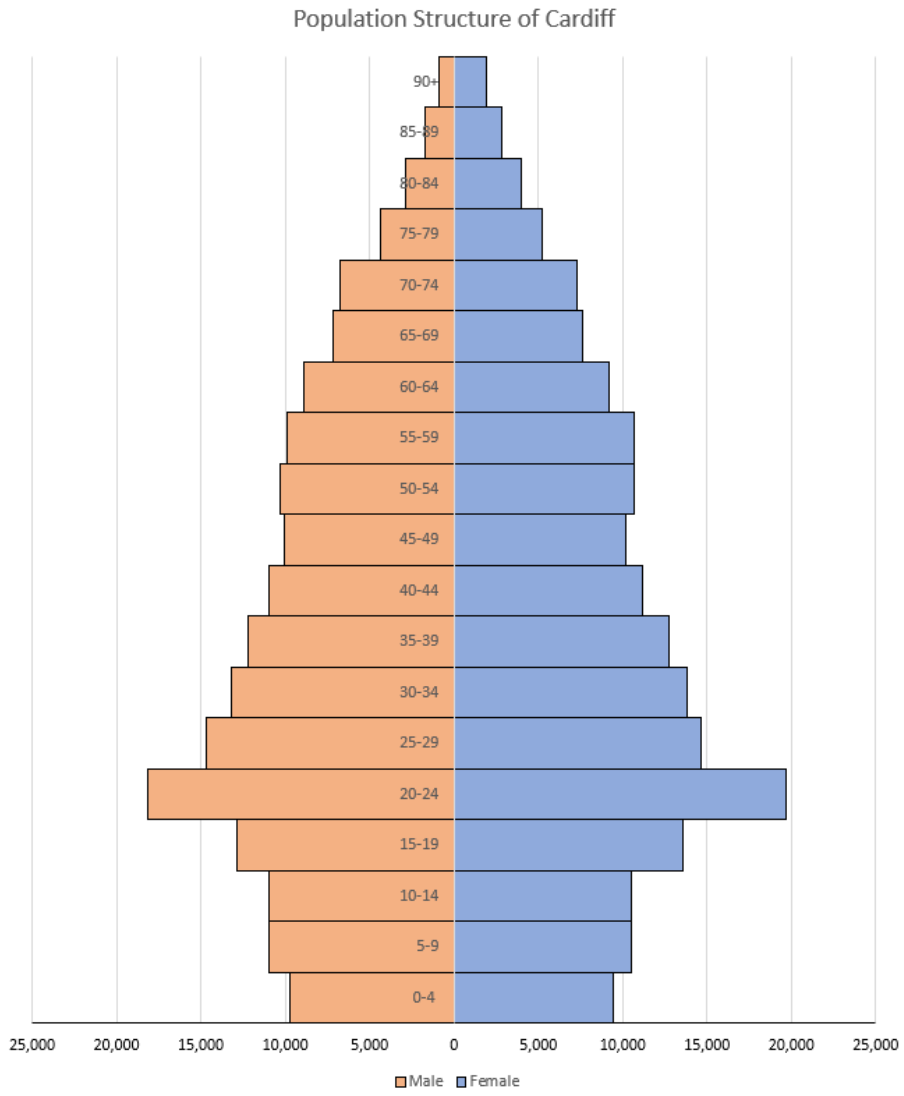

Figure 6 Population Structure of Cardiff 2021

The Welsh Index of Multiple Deprivation (WIMD) is the Welsh Government's official measure of relative deprivation for small areas in Wales. The components of deprivation considered within the overall deprivation index include factors such as income, employment, education, health, crime, barriers to housing & services and living environment. The WIMD ranks all small areas or Lower Super Output Areas (LSOAs) from most deprived to least deprived[21]. In Cardiff, 49% of LSOAs are ranked as being within the 50% most deprived in Wales which is the 10th highest percentage of any Welsh local authority. 18.2% of LSOAs are ranked in the most deprived decile in Wales. The WIMD Map covering Cardiff is shown in Figure 7.

[21] StatsWales (2019). WIMD 2019 Local Authority Analysis. [Online] Available at: https://statswales.gov.wales/Catalogue/Community-Safety-and-Social-Inclusion/Welsh-Index-of-Multiple-Deprivation/WIMD-2019/localauthorityanalysis

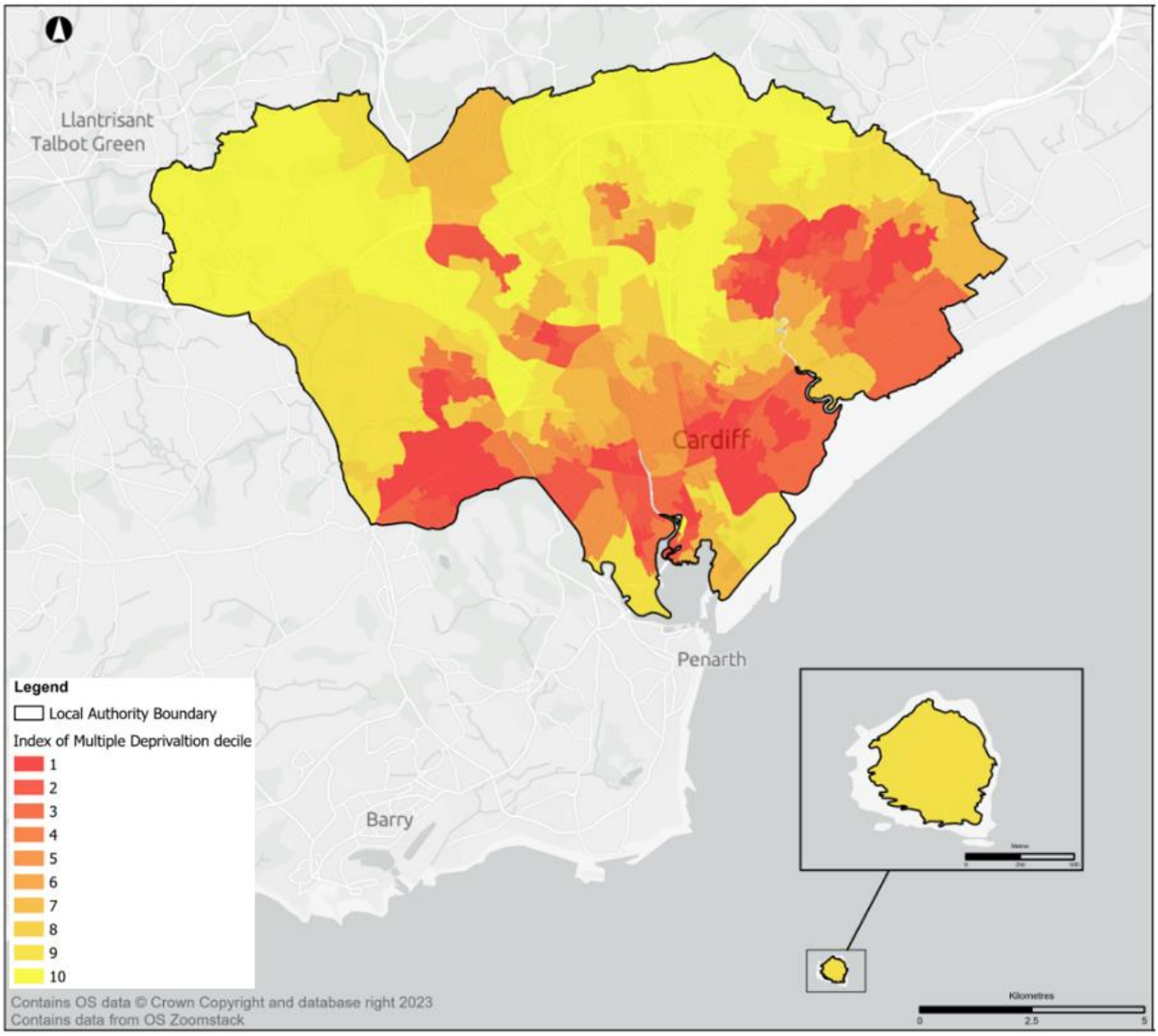

Figure 7 Welsh Index of Multiple Deprivation (WIMD) Map of Cardiff

Housing Details

According to the Welsh Government's most recent statistics, there were an estimated 156,264 households in Cardiff[22]. Based on the Office for National Statistics (ONS) national population statistics, the total number of households in Cardiff is projected to increase by 5.7% between 2018 to 2028, higher than the projected increase of 4.4% for Wales[23]. Cardiff is projected to have 161,900 households by 2028 which is significantly higher than any other local authority area in Wales.

Regarding overcrowding and under-occupancy, in 2021 Cardiff had the highest proportion of households with fewer bedrooms than required at 3.9% compared to any other local authority area in Wales. This was higher than the figure for Wales which was 2.2%[24]. Cardiff has the highest percentage of households living in one or two rooms at 12.8% and the lowest proportion of households with three bedrooms at 38.8% down from 40.1 in 2011.

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[22] StatsWales (2021). Households by Local Authority and Year. [Online] Available at: https://statswales.gov.wales/Catalogue/Housing/Households/Estimates/households-by-localauthority-year

[23] Welsh Government (2020). Local authority household projections for Wales: 2018-based (revised). [Online] Available at: https://www.gov.wales/sites/default/files/statistics-and-research/2020-08/subnational-household-projections-local-authority-2018-based-272.pdf

[24] Office for National Statistics (2023). Housing in Wales (Census 2021). [Online] Available at: https://www.gov.wales/housing-wales-census-2021-html

CC is a reasonably compact city with a successful city centre and regenerating bay. The city contains rings of residential development that reflect its period growth. The last few decades have seen significant growth in apartment living in both the city centre and Cardiff Bay. CC's Local Development Plan makes provision for the delivery of 41,000 new dwellings in Cardiff over the plan period (2006-2026)[25].

Rough sleeping

As of 31st August 2023, 43 individuals were estimated to be rough sleeping in Cardiff, whilst an estimated 167 individuals rough sleeping across Wales[26]. Between April to September 2023, there were 4,590 households were threatened with homelessness in Wales.[27]

Languages Spoken

According to the 2021 Census, 91% of Cardiff residents speak English as a main language. This is lower than the national rate where 97% of the population speak English as a main language. Other languages spoken as a main language in Cardiff and in Wales are European (EU) languages and South Asian languages, at 2% and 1%, respectively. Arabic, West or Central Asian languages, East Asian languages and African languages are each spoken as main languages by 1% of the population in Cardiff[28].

The 2021 census showed that 12.1% of the population can speak Welsh with over 20% of the population believed to have some Welsh language skills. The census also reports that the city of Cardiff has the 3rd highest population of fluent Welsh Speakers in Wales behind Gwynedd and Carmarthenshire.

Health Profile

According to the 2021 Census, 50.1% of CC residents described their health as "very good" and 31.8% described their health as "good", 4.5% of residents described their health as "bad" and 1.4% described their health as "very bad"[29].

The average life expectancy from 2017 to 2019 in Cardiff Local Authority for males was 78.4 and 83.0 for females. This is similar to the national average for Wales[30].

In 2021, 9.5% of Cardiff residents were identified as being "disabled and limited a lot". This figure decreased from 11.6% in 2011 (age-standardised proportions). CC was ranked 12th highest out of the 22 Welsh local authority areas for the population of people who were identified as being "disabled and limited a lot"[20].

Between2018 and 2020 9% of adults indicated that they experienced mental disorders as a type of illness, according to the Cardiff and Vale University Health Board. This is lower than the Welsh average of 10%.[31]

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[25] Cardiff Council (2017). Cardiff Residential Design Guide. [Online] Available at: https://www.cardiff.gov.uk/ENG/resident/Planning/Planning-Policy/Documents/Residential%20Design%20Guidance%20Final%20Version.pdf

[26] Gov.Wales. Homelessness accommodation provision and rough sleeping: August 2023. Available at: Homelessness: April to September 2023 [HTML] | GOV.WALES

[27] Gov.Wales. Homelessness: April to September 2023. Available at: Homelessness: April to September 2023 [HTML] | GOV.WALES

[28] Office for National Statistics. Census (2021). TS024- Main Language. Available at: Nomis - Official Census and Labour Market Statistics - Nomis - Official Census and Labour Market Statistics (nomisweb.co.uk)

[29] Office for National Statistics (2021). Cardiff Local Authority 2021 Census Area Profile. [Online]. Available at: https://www.nomisweb.co.uk/sources/census_2021/report?compare=W06000015#section_10

[30] InfoBaseCymru (2019). Life Expectancy by Local Authority. [Online]. Available at: https://www.infobasecymru.net/IAS/themes/healthandsocialcare/generalhealth/tabular?viewId=47&geoId=1&subsetId=

[31] StatsWales. General health and illness by local authority and health board, 2016-17 to 2019-20. Available at: General health and illness by local authority and health board,, 2016-17 to 2019-20 (gov.wales)

1.3.3 Accessible Natural Greenspace

NRW state that green space should be provided by following the following standards[32]:

- Everyone should live within 300m of accessible natural greenspace;
- There should be at least one accessible site of >20ha within 2km of home;
- There should be one accessible 100ha site within 5km; and
- There should be one accessible 500ha site within 10km.

Analysis carried out by independent charity Fields in Trust, in collaboration with CC, has found that 19% of the city's publicly accessible parks and green spaces equate to an area of 2,682 hectares, of which 1,073 hectares of green space in Cardiff is owned and managed by CC[33].

1.4 Soil, Geology and Contaminated Land

1.4.1 Baseline Information

The baseline section is supported by data from the British Geological Survey's GeoIndex Onshore tool using maps at a scale of 1:50,000.

1.4.2 Soil and Geology

Superficial Deposits

There are superficial deposits located across the vast majority of the Cardiff area with the exception being towards the north-east of Cardiff city and towards the north-west of the site boundary where on average the elevation is much greater than the rest of the Plan area (Figure 8).

Across the Plan area, land at higher elevations has little coverage of superficial deposits, whereas the land at lower elevations has high coverage. The majority of the south and south-east of the site boundary consist of tidal flat deposits including clay silt and sand due to the overall proximity to the Severn Estuary. These deposits extend along the main waterways within the Cardiff area and are of Quaternary age. More centrally there are glaciofluvial sheet deposits consisting of sand and gravel. These deposits are from the Devensian period. The remaining superficial deposits within the area are till or 'diamicton' from the Devensian period.

There is a small amount of valuable peatland resource in Cardiff which are critical for carbon storage, biodiversity and water regulation. The National Peatland Action programme has been established as a 5-year plan to restore peatlands across Wales, including those near Cardiff[34]. The Wales Peatland Data Portal provides detailed information on the location of peatlands and the areas that require restoration.[35]

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[32] Natural Resources Wales (2022). The Greenspace Toolkit - The Accessible Natural Greenspace Standards. [Online]. Available at https://www.eastsuffolk.gov.uk/assets/Planning/Rendlesham/Folder-9/9.13-Nature-Nearby-Accessible-Natural-Greenspace-Guidance-Natural-England.pdf

[33] Cardiff Council (2022). New analysis shows 19% of Cardiff is accessible green space. [Online] Available at: https://www.cardiffnewsroom.co.uk/releases/c25/28723.html

[34] Natural Resources Wales: The National Peatland Action Programme: https://naturalresourceswales.gov.uk/evidence-and-data/maps/the-national-peatland-action-programme/?lang=en

[35] Natural Resources Wales: Peatland Data Portal Map Layers: https://naturalresources.wales/evidence-and-data/maps/peatland-data-portal-map-layers/?lang=en

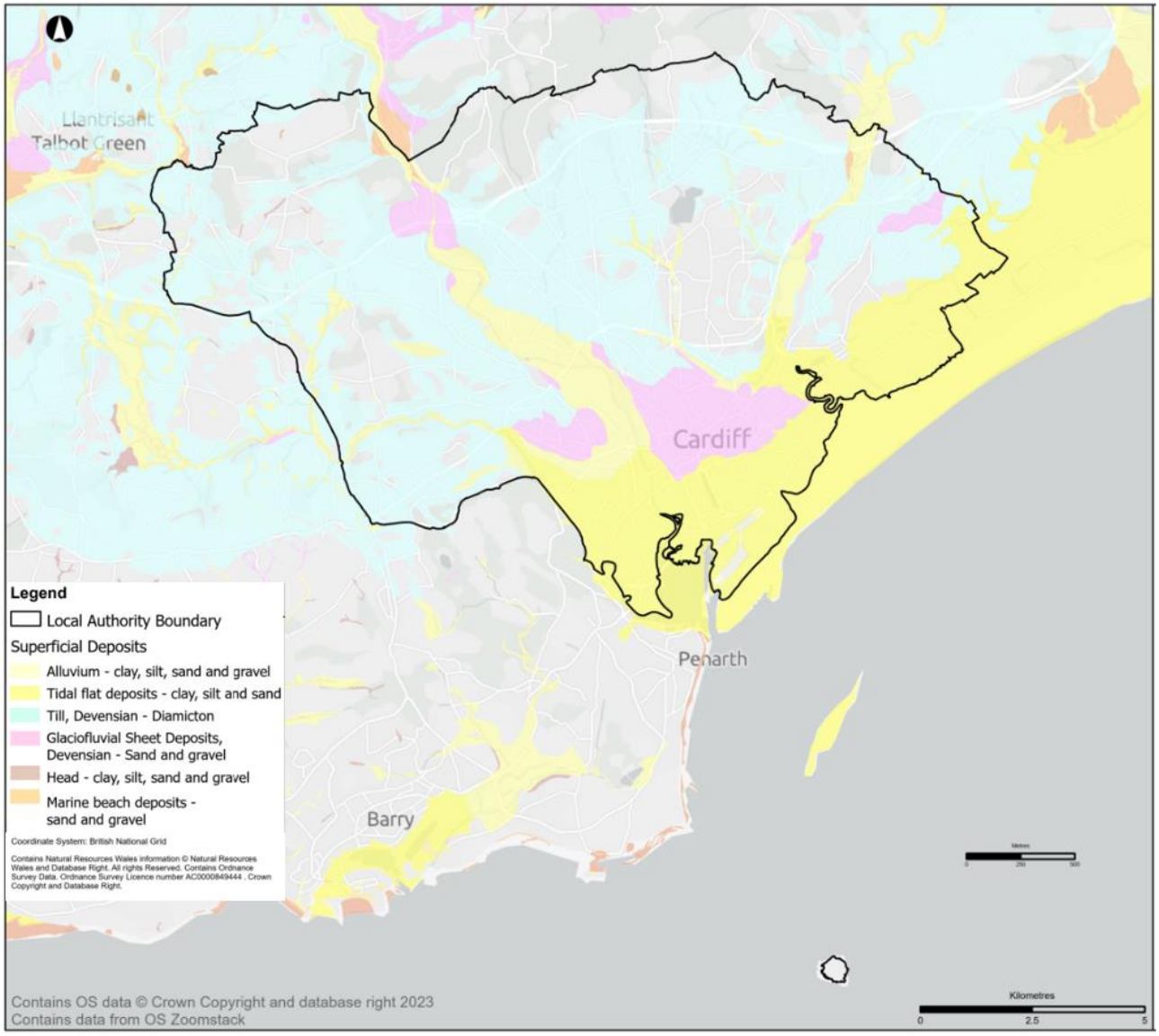

Figure 8 Geology of Cardiff

Bedrock Geology

The bedrock strata in the central, south, and east of the Plan area is part of the Mercia mudstone group which comprises of mudstone formed within the Triassic period. Towards the north of the Plan area, the bedrock forms part of the Llanishen conglomerate which comprises of red sandstones, siltstones, and mudstones with beds of pebbly sandstone and conglomerate[36]. To the north-east of Cardiff there are further deposits of mudstone, siltstone and sandstone from the Silurian and Devonian periods. The bedrock geology of the Plan area and surrounds is shown in Figure 9 below.

[36] BGS. Llanishen Conglomerate Formation. [Online] Available at: https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=LLC

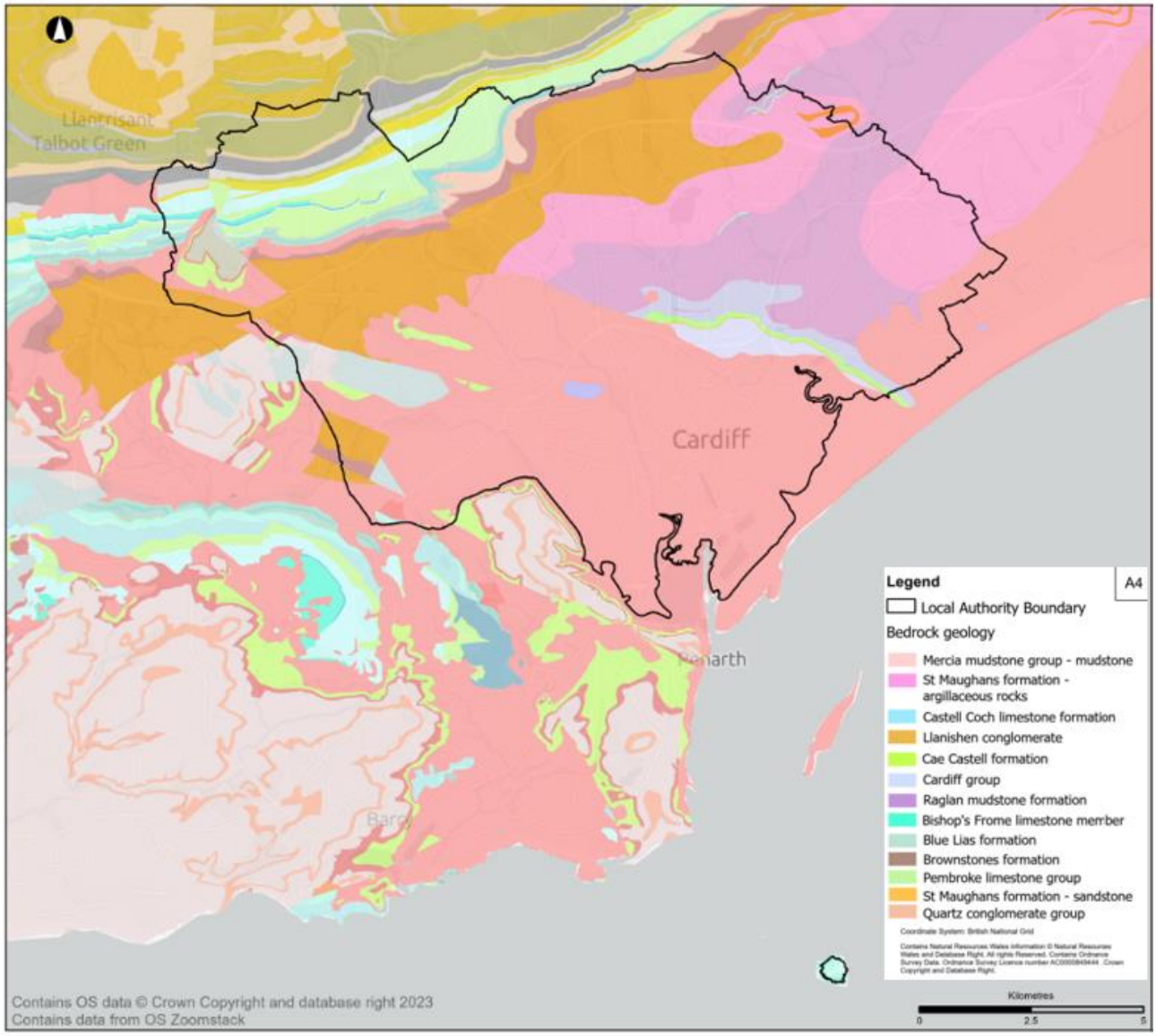

Figure 9 Bedrock geology of Cardiff

1.4.3 Contaminated Land

Land contamination in Wales is mainly dealt with through the planning process. The Local Planning Authority (LPA) has a duty to consider potential contamination when they prepare development plans and determine planning applications. A small percentage of contaminated sites are dealt with under Part 2A of the Environmental Protection Act (1990) and a similar amount under voluntary action[37]. The implementation of Part 2A aimed to empower Local Authorities to inspect their land for contamination which would encourage identification and remediation of contaminated land nationally.

The role of local authorities under Part 2A is to undertake the following[38]:

- inspect their areas to identify potentially contaminated land;
- conclude whether any particular site can be determined as contaminated land;
- confer with statutory consultees and interested parties;

[37] Natural Resources Wales (2016). The State of Contaminated Land in Wales. [Online] Available at: https://naturalresources.wales/media/677708/nrw26759-contaminated-land-in-wales-pdf_english-1.pdf

[38] Cardiff City Council (2010). Contaminated Land Inspection Strategy. [Online] Available at: https://www.srs.wales/Documents/Pollution/Contaminated-Land-Inspection-Strategy-Cardiff.pdf

- act as the Enforcing Authority for all contaminated land not designated as a ‘special site’;
- collate and manage contaminated land data;
- maintain a public register of enforcement action taken.

There are currently no permitted landfills in Cardiff[39]. The historic landfills are primarily situated in the northeast, east, and southwest of Cardiff, with scattered pockets of historic landfills throughout the region[40] (Figure 10).

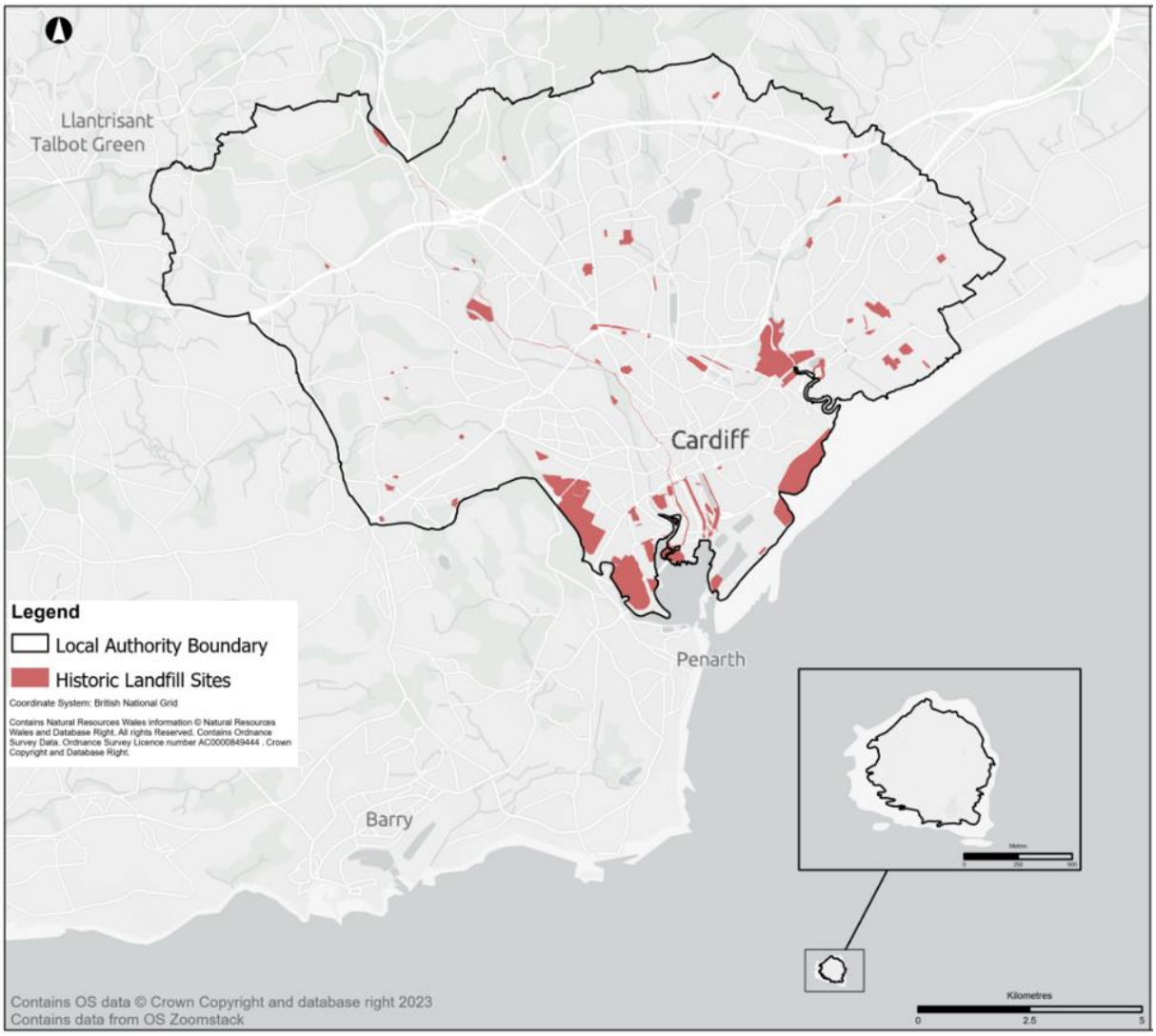

Figure 10 Historic Landfill Sites in Cardiff

Risk mapping prepared by Zetica[41] provides a high level assessment of regional World War Two (WWII) bombing densities and UXO hazard sources in the area. Based on the risk mapping, Cardiff is an area of moderate risk from Unexploded Ordnance (UXO).

[39] List of Registered Landfill Site Operators in Wales. [Online] Available at https://www.gov.wales/check-list-registered-landfill-site-operators-wales

[40] Historic Landfill Sites. Data Map Wales [Online] Available at https://datamap.gov.wales/maps/new?layer=inspire-nrw:NRW_Historic_Landfill_Sites#/

[41] Risk Maps. Zetica UXO. [Online] Available at https://zeticauxo.com/guidance/risk-maps/

South Wales Coalfield, part of which extends under Cardiff, closed following the decline of the coal industry, however as a result disused coal tips are located within Cardiff's boundaries [42]. These sites are monitored for safety to ensure they do not pose a risk to the public and the environment [43].

1.5 Water

1.5.1 Baseline Information

This section outlines the water resources in CC. The information in this section is primarily taken from DataMapWales[1] and British Geological Survey[44].

1.5.2 Water Resources

The three main rivers that flow through Cardiff are the River Ely, River Taff and the River Rhymney.

Figure 2: Cardiff Catchments Overview shows the location of these water courses and their catchments within the Plan area. The river catchments within Cardiff fall within the South East Valleys Management Catchment. The valley rivers within this catchment flow from the steep locations of the Bannau Brycheniog ending at the lower coastal areas of Cardiff and Gwent[45]. The rivers of the South East Valleys all converge into the Severn Estuary, which is designated as a Ramsar site, SPA, SAC and SSSI as mentioned within 1.2 *Biodiversity, Flora & Fauna*.

The River Ely, Taff, and Rhymney originate in the Bannau Brycheniog and flow towards Cardiff. The rivers all were affected by pollution due to the expansion of heavy industry in Wales in the mid-1800s, but as a result of habitat improvement projects and tighter regulation of polluting industries, the pollution levels in the River Ely, Taff and Rhymney have decreased[46]. The water supply in South Wales is managed through various designated areas, with the South East Wales Conjunctive Use System being the most extensive. This system oversees the distribution of water from twelve treatment facilities, ensuring a steady supply to the regions of Newport, Cardiff, and the valleys of South East Wales.

A Strategic River Restoration Plan[47]. has been developed for the River Ely which sets out restoration options for the river, by identifying key opportunities for river restoration to improve the WFD status of the Ely catchment and waterbodies. These opportunities include:

- removing INNS catchment-wide,
- weir / culvert / embankment modification or removal,
- floodplain reconnection/lowering and channel reprofiling,
- use of woody material,
- riparian planting and bank improvement works,
- SuDS; and
- backwater/wetland creation

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[42]Northern Mine Research Society. [Online] Available at: https://nmrs.org.uk/mines-map/coal-mining-in-the-british-isles/swales/

[43] Welsh Government. [Online] Available at: https://www.gov.wales/coal-tip-safety

[44] British Geological Survey. [Online] Available at: https://www.bgs.ac.uk/

[45] Drainage and Wastewater Management Plan (2024). River Basin Catchment Summary – South East Valleys. [Online] Available at: https://naturalresources.wales/media/679387/2016_updated-south-east_valleys_catchment_summary_nrw.pdf#:~:text=The%20main%20rivers%20in%20the%20South%20East%20Valleys,and%20Cardiff%2C%20which%20has%20an%20important%20commercial%20port.

[46] Natural Resources Wales: South East Valley's Management Catchment Summary. Available at: South East Valleys Management Catchment (naturalresources.wales).

[47] Natural Resources Wales: River Ely Natural Capital Assessment: Potential Opportunities.

Cardiff sits within the South East Valleys Abstraction Licensing Strategy, which sets out how water resources are managed within the South East Valley Catchments. It explains where water is available for abstraction and indicates how reliable a new abstraction license may be.

Water abstraction for public water supply accounts for 53% of yearly water abstraction. The primary challenges facing water resources arise from a group of public water supply reservoirs located at the headwaters of the Taff, Rhymney, Rhondda, Cynon, and Ebbw catchments. While located outside of the LFRMS area, they affect water resources further downstream. The upkeep of Cardiff Bay and significant unregulated abstractions by dock feeders at the lower reaches of the Taff and Ebbw Rivers contribute to the strain on these resources. Additionally, the flow within Roath Brook is under stress from existing licensed water withdrawals, raising concerns about the sustainability of water resources in the area[48].

In Cardiff, the failure of waterbodies to meet the Water Framework Directive (WFD) standards is often due to the physical alterations of watercourses, which disrupt their natural connection with floodplains and riparian zones. These physical changes impact more than just fish migration; they are fundamental to the overall functionality of watercourses, affecting water quality and flow. To foster robust habitats and natural processes, there is an urgent need to enhance and restore the geomorphology of Cardiff's waterbodies. Without such efforts, the habitats necessary for fish and invertebrates will deteriorate, leading to issues like erosion and sedimentation that can exacerbate flooding and degrade water quality.

1.5.3 Water Use

Most residential properties receive drinking water directly from a mains pipe supplied by Welsh Water. The Environment Agency has designated 11 principal aquifers in England and Wales. Based on the British Geological Survey[49], the principal aquifer in Cardiff is the Carboniferous Limestone. The Carboniferous Limestone is a massive, well-fissured karstic limestone that gives large water supplies of up to 175 l/sec from resurgences in the Mendips and South Wales, and borehole yields of up to 40 l/sec from the upper parts of the aquifer. Water bodies also provide centres for recreational activity. For example, recent developments by DCWW at the Llanishen and Lisvane reservoirs, as well as being designated for environmental importance, offer expansive recreational facilities such as water-based leisure activities.

Some waterbodies in Cardiff may be classified as Heavily Modified Waterbodies (HMWB) due to their function as a flood risk asset, which can provide valuable social and economic benefits, and therefore designated under Article 4.3 of the WFD.

1.5.4 Surface Water Quality

Surface water quality varies across the Plan area as outlined in the Water Framework Directive (WFD) 2021 Cycle 3 Waterbody Status data in Table 4. Overall waterbody status in the Plan area ranges from Poor to Moderate with no areas in the Plan area having a Good overall waterbody status. There has been an overall improvement in surface waterbody status since the 2015 Cycle 2 data was collected as shown in Figure 11 where there are two areas labelled as 'Bad'. The ecological status of waterbodies ranges from Poor to Good across the area and the chemical status varies from moderate to high. All waterbodies apart from Cardiff Bay have at least one failing element which is driving the overall classification status of the waterbody.

[48] Natural Resources Wales: South East Valleys Abstraction Licensing Strategy (2017) [Online] Available at: https://cdn.cyfoethnaturiol.cymru/media/683371/sev-licensing-strategy-final-nov-17.pdf?mode=pad&rnd=131596369491970000

[49] Principal Aquifers in England and Wales. British Geological Survey [Online] Available at: https://www2.bgs.ac.uk/groundwater/shaleGas/aquifersAndShales/maps/aquifers/home.html

Table 4 WFD 2021 Cycle 3 Waterbody Status in Cardiff[50]

Waterbody	Reference	Waterbody Status	Ecological Status	Chemical Status	Failing Elements
Ely R - conf Nant Clun to Allot Gardens, Ely	GB109057027260	Poor	Poor	Moderate	Fish, Invertebrates, Polyaromatic hydrocarbons (PAH), Phosphate
Taff - conf Rhondda R to Castle Street	GB109057027270	Moderate	Moderate	Moderate	Polyaromatic hydrocarbons (PAH), Mitigation Measures
Nant Glandulas - source to conf Rhymney R	GB109057027160	Poor	Poor	High	Fish, Mac Phyto (diatoms), Hydrological regime, Mitigation Measures Assessment
Roath Brook	GB109057027150	Moderate	Moderate	High	Invertebrates, Mac Phyto (diatoms), Phosphate, Mitigation Measures
Rhymney R - conf Nant Cylla to Chapel Wood	GB109057027280	Moderate	Good	Moderate	Brominated diphenylether (BDPE), Polyaromatic hydrocarbons, Heptachlor and heptachlor epoxide
Rhosog Fach Reen - source to Seven Estuary	GB109056026770	Moderate	Moderate	High	Ammonia, Dissolved Oxygen, Phosphate, Mitigation Measures Assessment
Whitchurch Bk - source to conf R Taff	GB109057027220	Moderate	Moderate	High	Phosphate. Mitigation Measures Assessment
Nant Dowlais - source to conf Ely R	GB109057027080	Poor	Poor	High	Fish, Phosphate
SEVERN LOWER	GB530905415401	Moderate	Moderate	Moderate	Mercury, Angiosperm (saltmarsh) Invertebrates, Mitigation

[50] Natural Resources Wales. (2024). Water Framework Directive (WFD) 2021 Cycle 3. [Online] Available at: Natural Resources Wales - Citrix FileShare (sharefile.eu)

Waterbody	Reference	Waterbody Status	Ecological Status	Chemical Status	Failing Elements
					Measures Assessment
Whitchurch Canal	GB70910006	Moderate	Moderate	High	Mitigation Measures Assessment
Cardiff Bay	GB30947042	Moderate	Moderate	High	Mitigation Measures Assessment

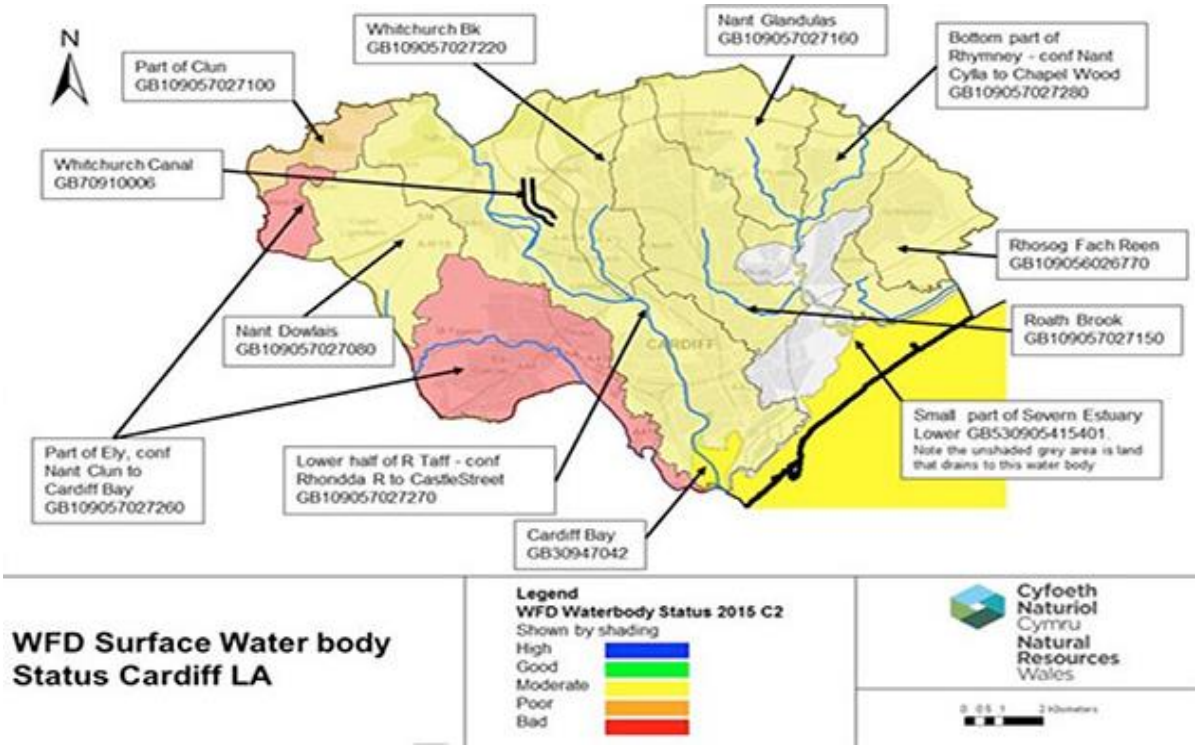

Figure 11 WFD 2015 Cycle 2 Surface Water Status Cardiff

1.5.5 Groundwater

The Plan area is situated upon the SE Valleys Eastern Devonian Old Red Sandstone and Triassic Mercia Mudstone groundwater body (ID: GB40902G204700) as defined by the WFD Groundwater bodies Cycle 3. Small areas of Cardiff Unitary Authority are covered by SE Valleys Carboniferous Limestone (ID: GB40901G203600) and SE Valleys Carboniferous Coal Measures (ID: GB40902G201900).

Under the WFD, a groundwater body represents a distinct body of groundwater flow with a coherent flow unit including recharge and discharge areas with little flow across the boundaries[51].

Based on NRW's Groundwater Quality Network (GWQN) data, groundwater quality is generally in good health but continues to be affected by the legacy of coal and metal mining, intensive land use activities including agriculture and localised pollution incidents[52]. Of the 38 Groundwater bodies in Wales, 21 were

[51] DataMapWales (2023). Water Framework Directive (WFD) Groundwaterbodies Cycle 3. [Online] Available at: https://datamap.gov.wales/layers/geonode:nrw_wfd_groundwater_c3_baseline_classification#:~:text=Water%20Framework%20Directive%20(WFD)%20Groundwaterbodies%20Cycle%203%20(2021%2D,Water%20Framework%20Directive%20(WFD).

[52] Natural Resources Wales (2024). Groundwater in Wales. [Online] Available at: https://epwales.org.uk/wp-content/uploads/2024/01/EPW-Presentation-Groundwater-in-Wales.pdf

classified as ‘Good’ and 17 as ‘Poor’. The SE Valleys Eastern Devonian Old Red Sandstone groundwater body was classified as ‘Good’ for overall waterbody status.

1.5.6 Cardiff Bay (Rivers Taff & Ely)-Water supply

The Cardiff Bay Barrage serves to contain the waters of the Rivers Taff and Ely. As stipulated by the Cardiff Bay Barrage Act of 1993, the CC, which operates the barrage, strives to keep the water level in the bay relatively stable at approximately 4.5 meters above Ordnance Datum. This is achieved by operating one or more of the five sluice gates. To prevent saltwater from entering the freshwater bay, the sluices are shut when tidal levels exceed the bay’s water level. During these ‘tide-lock’ periods, the bay acts as a reservoir for the river water. Once the tide recedes below the bay’s level, the sluices are opened to adjust the water level back to the desired height. Freshwater is essential for certain functions of the barrage, such as maintaining a steady flow for the fish pass and operating navigation locks. An operational agreement is in place to distribute the available water among various users at the barrage, especially during times of low water flow. Therefore, when the combined flow of the rivers drops below a specified level, the water is completely allocated.

There were concerns during the construction of the Cardiff Bay barrage about potential groundwater flooding affecting subterranean structures in Cardiff’s Grangetown area. To track this, monitoring boreholes were installed. The data collected from these boreholes are valuable historical records of groundwater levels and can be used to determine if such flooding has taken place

1.5.7 Gwent Levels-Water supply

The Caldicot and Wentlooge Levels are a series of small, restored coastal plains in the South East Valleys, dependent on water levels for their integrity. These Levels form part of the broader Gwent Levels, which stretch from Cardiff to Chepstow along the Severn Estuary’s low-lying terrain. Managed by NRW, the Caldicot and Wentlooge Levels serve multiple purposes, including facilitating land drainage, mitigating flood risks, supporting agriculture, fostering conservation, and accommodating development. Water abstraction within these Levels is carefully regulated to prevent a decrease in the water table, which could

lead to land subsidence.

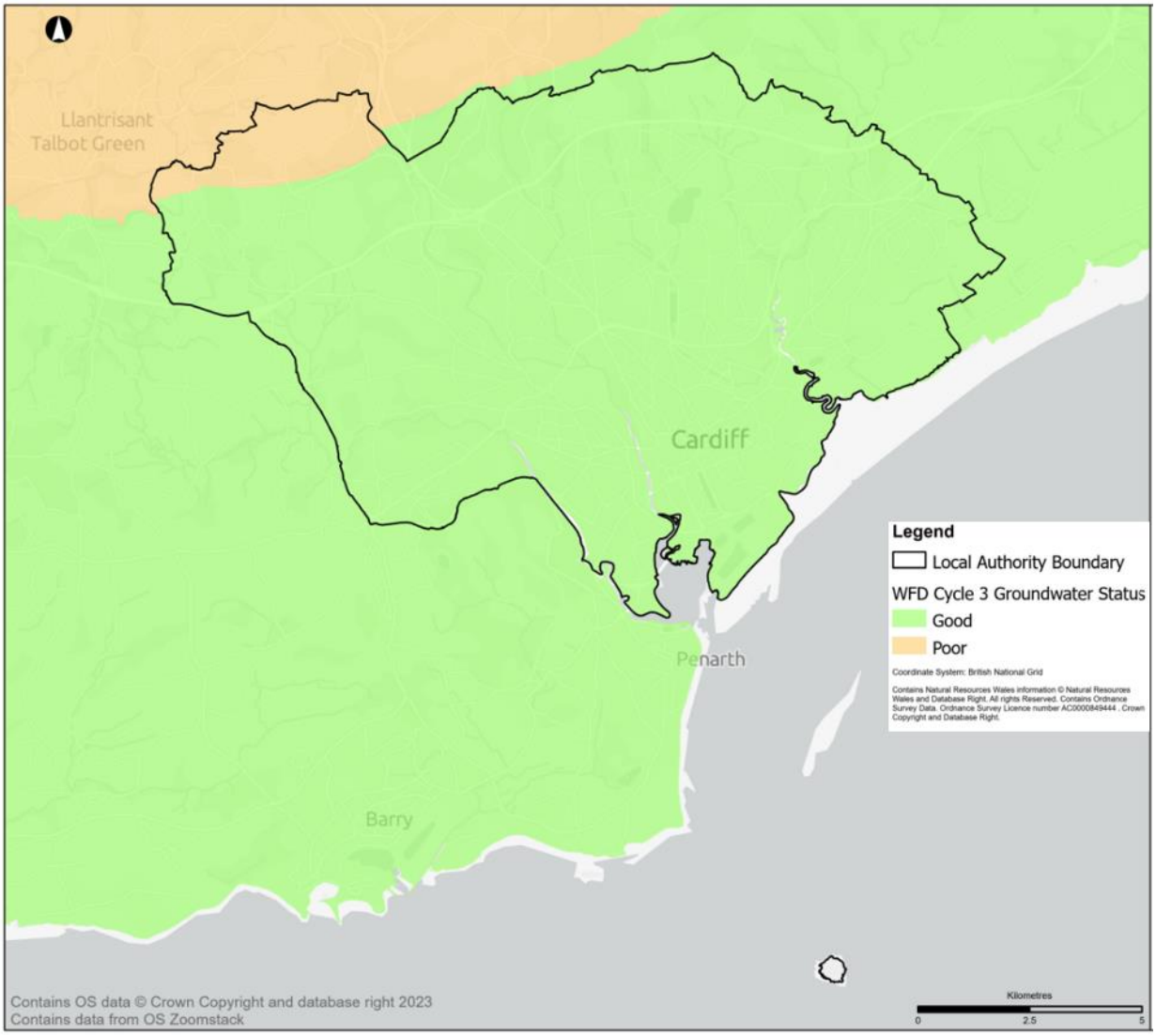

Figure 12 WFD Cycle 3 Groundwater Chemical Status Results in Cardiff

1.5.8 Flooding

Due to the coastal location of Cardiff as well as the relatively flat topography, the area is particularly vulnerable to flooding. Figure 14 illustrates both the pluvial and fluvial flood risk across the Plan area. CC is one of the most at risk areas in the UK for flooding, the nearby local authorities of Neath Port Talbot and Rhondda Cynon Taff are all within the top 10 local authority areas at the highest risk of flooding in the UK.

1.6 Air Quality

1.6.1 Baseline Information

A SEA was undertaken to ensure environmental effects are considered during the development of the FCERM: Development of a National Strategy for Wales. The scoping for the SEA was undertaken in Autumn 2018 to focus the assessment on the likely significant effects of the FCERM which concluded that significant effects on air quality were unlikely and therefore the topic was scoped out[53].

[53] Welsh Government (2020). Flood and Coastal Erosion Risk Management: Development of a National Strategy for Wales. [Online]. Available at: https://www.gov.wales/sites/default/files/publications/2020-10/strategic-environmental-assessment-flood-and-coastal-erosion-risk-management-national-strategy-for-wales.pdf

CC undertakes regular air quality monitoring at specifically allocated locations across Cardiff using automated and non-automated principles for ambient air Nitrogen Dioxide (NO_2), Particulate Matter (PM_{10} & $PM_{2.5}$), Sulphur Dioxide (SO_2), Carbon Monoxide (CO) & Ozone (O_3).

A review of the Cardiff Council's Local Air Quality Management (LAQM) Annual Progress Report 2023[54] shows there are currently four Air Quality Management Areas (AQMAs) within Cardiff. These areas are at locations within Ely Bridge, Llandaff, Stephenson Court on Newport Road, and Cardiff City Centre. All monitoring locations within the AQMAs were compliant with the relevant objectives for NO_2 in 2022. However, one non-automatic monitoring site located within the Llandaff AQMA was close to the annual air quality objective limit of 40µg/m^3, with a result of 39.3µg/m^3. In 2022, all other locations monitored locations within Cardiff show concentrations below the relevant objectives including the nitrogen dioxide and particulate matter. However, emerging legislative controls via The Environment (Air Quality and Soundscapes) Bill will introduce new air quality targets in Wales, although no significant effects are considered likely.

Flood alleviation plans that could impact traffic routes will need to consult Cardiff's Air Quality Management Plans to ensure any resulting changes to traffic flows do not worsen air quality. However, the increasing adoption of electric vehicles in Cardiff is expected to contribute to lower NOx emissions, enhancing air quality in local communities.

1.7 Climatic Factors

1.7.1 Baseline Information

The Met Office generates a climatology for each area of the UK, known as climate regions, these climatologies utilise historical regional climate information. The meteorological station in Cardiff is Cardiff Bute Park. The Met Office also produced the Cardiff Climate Pack which provides high level, non-technical.

1.7.2 Carbon

Between 2005 and 2018 Cardiff saw significant decreases in CO_2 emissions, with a 46% decrease in per capita emissions and 39% decrease in absolute emissions (an average 3% per year reduction in total emissions)[55]. Industry and commerce have shown the greatest decreases in Cardiff. There has also been significant decrease in domestic emissions and modest reductions in road emissions mainly due to rising energy costs[56]. According to the Department for Business, Energy, and Industrial Strategy (BEIS) (2020), in 2018 carbon emissions across the Plan area were 1,647 kt CO_2. In 2021 this value fell to 1,602.5 kt CO_2 with the greatest proportion coming from the domestic sector (28%)[57].

1.7.3 Future Climate

The Welsh Government published its Climate Change Strategy in October 2010. It has committed to reduce greenhouse gas emissions over which it has control by 3% per year from 2011 onwards. The Welsh Government has also prepared Statutory Guidance on adapting to climate change for Reporting Authorities in Wales. NRW is one such authority[58].

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[54] LAQMA Annual Progress Report (2023) [Online] Available at https://www.srs.wales/Documents/Air-Quality/Cardiff/Cardiff-2023-APR-FINAL.pdf

[55] Department for Business, Energy & Industrial Strategy (2020). UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2018. [Online] Available at: https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-to-2018

[56] Cardiff Council One Planet Cardiff. Our vision for a carbon neutral City by 2030. [Online] Available at: https://www.oneplanetcardiff.co.uk/#city

[57] Department for Energy Security and Net Zero (2024). UK greenhouse gas emissions: 2005 to 2021 local authority greenhouse gas emissions dataset. Available at: https://www.data.gov.uk/dataset/723c243d-2f1a-4d27-8b61-cdb93e5b10ff/uk-greenhouse-gas-emissions-local-authority-and-regional

[58] Climate Change Overview (2023). Natural Resources Wales. [Online] Available at: https://naturalresources.wales/about-us/what-we-do/our-roles-and-responsibilities/climate-change/climate-change-overview/?lang=en

The changes in climate that are already being experienced across Wales are projected to continue and intensify with the amount of change that occurs being strongly dependent on how successful global efforts for reducing greenhouse gas emissions are.

According to the Met Office City Pack, it is expected that average temperatures will increase, and average precipitation rate during the summer will decrease, but winter precipitation rate will increase, resulting in potential seasons of droughts and floods[59]

Annual temperatures in Wales are expected to rise between approximately 1.2°C by the 2050s and between 1.3 and 2.3°C by the 2080s from a 1981-2000 baseline. Frequency and intensity of extreme weather is also projected to increase, with days above 40°C becoming more frequent. Summer rainfall is expected to decrease by approximately 15% from a 1981-2000 baseline by the 2050s which will result in periods of water scarcity becoming more prevalent. Decreased precipitation and increased days of high heat increase the risk of drought and wildfires[60].

Rainfall trends are expected to vary in Wales depending on the season. In winter, rainfall is expected to increase by approximately 6% by the 2050s from a 1981-2000 baseline which will increase the likelihood of flooding of infrastructure, businesses and homes. By 2050, it is projected that people currently exposed to frequently flooding will increase by 35%, affecting over 200,000 people[60]. Additionally, the risk of landslides and coal tip collapses in Wales is heightened by increased rainfall and more extreme weather[60].

Using scenarios for Cardiff, sea level is expected to rise by between approximately 22 and 28cm by the 2050s and by approximately 43 to 76cm by the 2080s, compared to a 1981-2000 baseline and depending on global efforts to reduce greenhouse gas emissions. Such rises could lead to an increase in likelihood of associated risks, such as saltwater intrusion of agricultural land and flooding of coastal communities[61]. The Shoreline Management Plan aims to manage coastal erosion and flood risks sustainable.

Dŵr Cymru (Welsh Water) identify four areas of concern related to climate change in terms of demand and supply: North Eyri/Ynys Mon in north Wales, the South East Wales Conjunctive Use System (SEWCUS) area in south Wales covering Cardiff, Newport and the Valleys and Tywyn Aberdyfi in west Wales and Pembrokeshire[61].

The Public Health Wales's Climate Change Health Impact Assessment examines the potential implications of climate change on health and well-being across Wales, and supports action on climate adaptation and resilience.

1.8 Flooding

1.8.1 Baseline Information

NRW provides a national assessment of risk flooding from Rivers, the Sea and Surface Water and Small Watercourses. The assessment takes into account flood defences and combines new, national-scale modelling with detailed local-scale models to categories risk into 3 bands, labelled 'High', 'Medium' and 'Low' risk.

1.8.2 Flood Zones

The NRW Flood Map[62] for Planning (FMfP) indicates the potential extent of flooding assuming no defences are in place; it also takes into account the effects of climate change over a 100 year lifetime of development[*].

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[59] Met Office. Cardiff Climate Pack. Available at: SPF City Pack_editable_template (metoffice.gov.uk)

[60] Public Health Wales. Climate Change in Wales: Health Impact Assessment. Available from: phw.nhs.wales/news/health-impact-assessment-highlights-urgent-need-to-protect-health-and-wellbeing-as-the-climate-changes/climate-change-in-wales-health-impact-assessment/

[61] UK Climate Risk (2021). Evidence for the third UK Climate Change Risk Assessment (CCRA3): Summary for Wales. [Online] Available at: https://www.ukclimaterisk.org/wp-content/uploads/2021/06/CCRA-Evidence-Report-Wales-Summary-Final.pdf

[62] Natural Resources Wales Flood Map for Planning. [Online] Available at: https://flood-map-for-planning.naturalresources.wales/

[*] Whilst the FMfP does not yet have official status until the Welsh Government publish a revised TAN15,., it represents the best available information on flood risk and it is used to inform planning advice.

With regard to coastal flooding, the FMfp indicates that the coastal area in Cardiff is located within Flood Zone 3 for coastal flooding. Flood Zone 3 represents an area with a high probability of flooding (greater than 1 in 100 annual probability of river flooding or a 1 in 200 or greater annual probability of flooding from the sea). Additionally, much of the Plan Area is located in Flood Zone 2 which represents an area with a medium risk of flooding (between a 1 in 1000 and 1 in 100 annual probability of river flooding or a flood from the sea between 1 in 200 and 1 in 1000). These Flood Zones are shown in Figure 13 below.

The TAN15 Development Advice Map (DAM)[63] is hosted by the Welsh Government and is the screening tool used for planning purposes. It indicates that areas along the coast of Cardiff are located within Zone B, Zone C1 and Zone C2. Each of these development advice zones attribute different planning actions set out in TAN15 (2004)[64]. These actions aim to avoid inappropriate development in areas at risk of flooding. The following Zones are most prevalent within Cardiff:

- Zone B represents areas know to have flooded in the past as represented by sedimentary deposits.
- Zone C1, represents areas of the floodplain which are developed and served by significant infrastructure, including flood defences.
- Zone C2 represents an area of a floodplain without significant flood defence infrastructure.

[63] Natural Resources Wales Development Advice Map and National Flood Hazard and Risk Maps Viewer. [Online] Available at: https://maps.cyfoethnaturiolcymru.gov.uk/Html5Viewer/Index.html?configBase=https://maps.cyfoethnaturiolcymru.gov.uk/Geocortex/Essentials/REST/sites/Flood_Risk/viewers/Flood_Risk/virtualdirectory/Resources/Config/Default&layerTheme=0

[64] Welsh Government. Technical advice note (TAN)15: development and flood risk (2004). Available at: Technical advice note (TAN) 15: development and flood risk (2004) | GOV.WALES

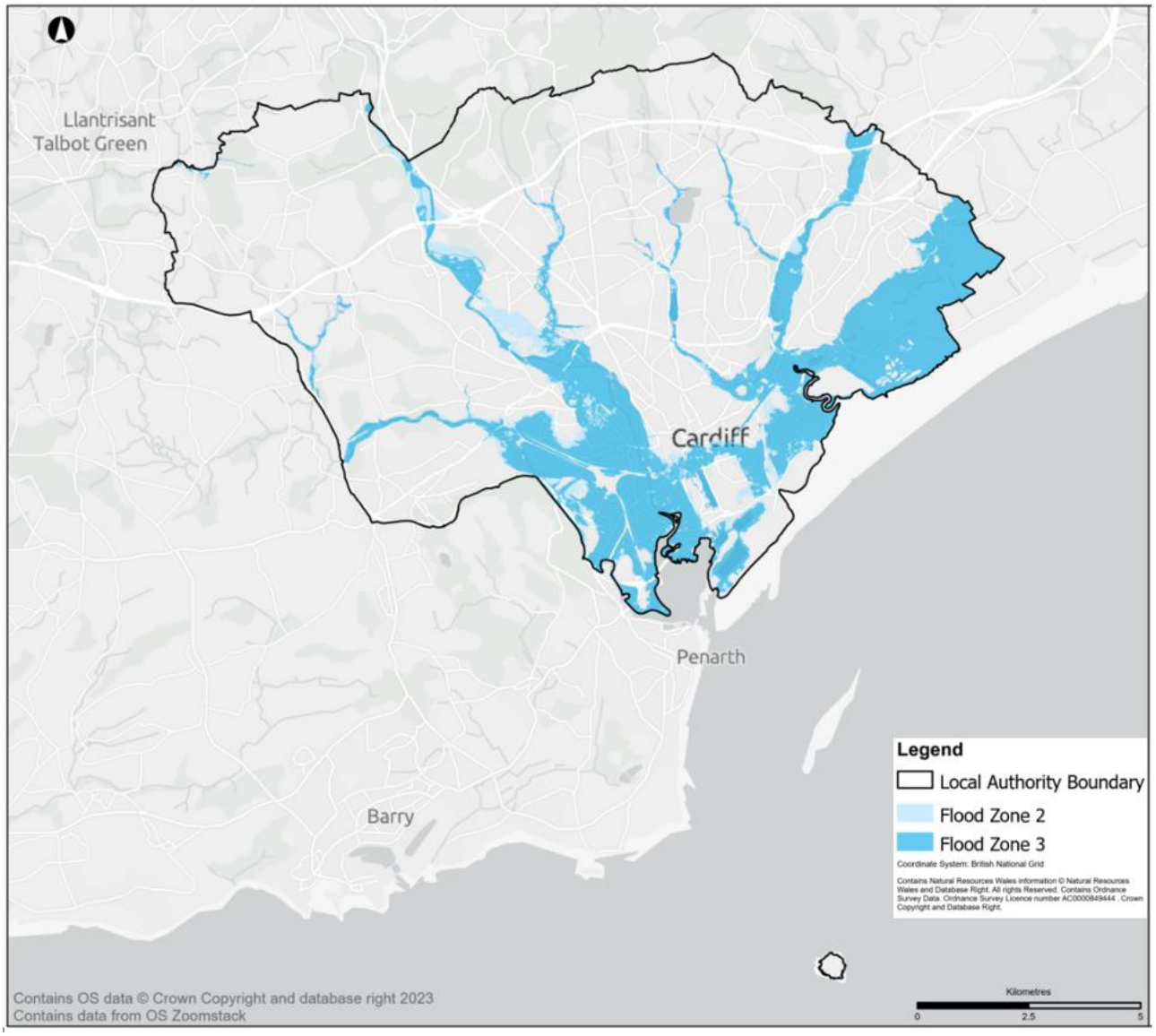


Figure 13 DAM Flood Zones in Cardiff

1.8.3 Groundwater Flood Risk

Groundwater flooding happens when water levels beneath the ground rise above the surface levels. It is most likely to occur in regions underlain by porous rocks known as aquifers. These aquifers can either be widespread, like chalk or sandstone, or more localised, such as sand or river gravels found in valley bottoms underpinned by less porous rocks. Based on the findings from the Cardiff Flood Risk Management Plan, there is no information on historic groundwater flooding which suggests that the risk of groundwater flooding across CC is considered low. There is also a risk of groundwater flooding caused by groundwater rebound, which occurs when large historical abstractions cease pumping, allowing groundwater levels to return to pre-abstraction levels. Underground structures which were constructed during the period of lower groundwater levels, may become particularly susceptible to flooding.

1.8.4 Ordinary Watercourse and Surface Water Flood Risk

Surface Runoff and Small Watercourses

Flood risk from surface runoff and small watercourses is varied across the study area as shown in Figure 14, elevated surface runoff is predominantly due to insufficient drainage which has not kept up with the growth of the city within the last few decades. The use of hard, non-porous surfaces across the urban area in combination with heavy downpours has meant the rain does not get absorbed into the soil as much as it should which results in flooding. The impacts of climate change are making surface water flooding more

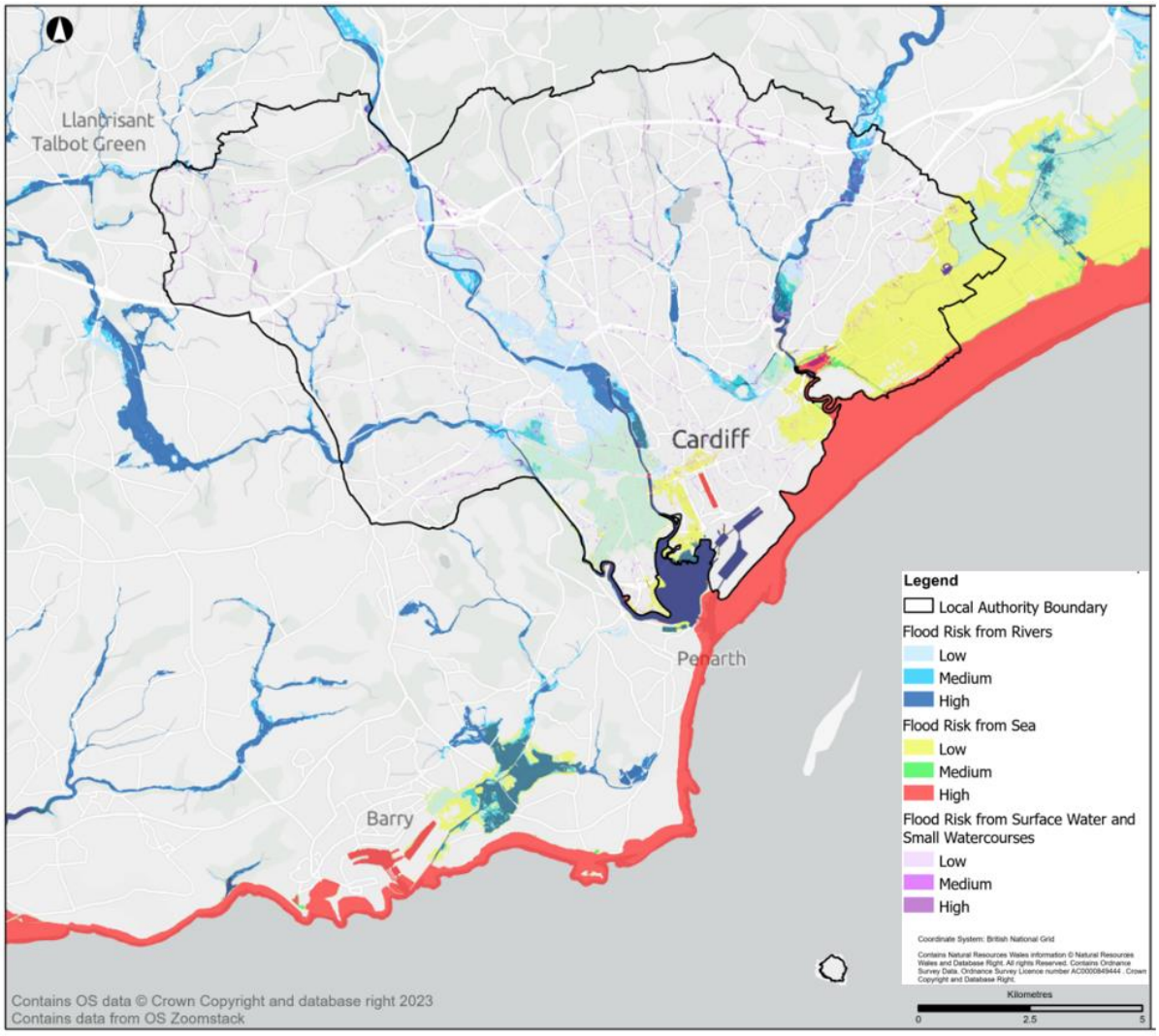
prevalent due to changing weather patterns where rain falls in sudden heavy bursts rather than being sustained over a longer period.

Combined Sewer Flooding

Combined sewers are under the ownership of Dŵr Cymru Welsh Water and carry both rainwater and wastewater to the sewage treatment works. During heavy rainstorms, more water enters the combined sewer systems beyond their capacity which causes them to release pressure through Combined Storm Overflows (CSOs) into rivers or the sea. The operation of Welsh Water's CSOs is highly regulated and is permitted and monitored by environmental regulators including NRW and Environment Agency. As a result of climate change, CSOs are releasing more from combined sewer systems into watercourses due to increased storm frequency. This, in combination with increased amounts of impermeable surfaces in the city has increased surface runoff and flooding of this kind[65].

Highways and Flooding

Increasing rainfall as a result of climate change has increased the prevalence of flooding on roads and highways in Cardiff due to blocked drains and gullies. Heavy rainfall has meant that the current drainage system in the city is unable to cope with the increasing volume of water. The drainage system in Cardiff was built in the Victorian era and is now unable to cope with the higher average rainfalls that Cardiff is experiencing[66].



[65] Dŵr Cymru. Combined Storm Overflows. [Online] Available at: https://corporate.dwrcymru.com/en/community/environment/combined-storm-overflows

[66] Johnson, T. (2023) The roads in Cardiff that flood every time it rains. WalesOnline. [Online] Available at: https://www.walesonline.co.uk/news/wales-news/roads-cardiff-flood-every-time-28289226

Figure 14 Flood Risk in Cardiff

1.8.5 Flooding from reservoirs

In Cardiff, there is a potential risk of reservoir flooding due to the failure of a dam or other water retaining structure. Although the probability of this is low, the consequences are highly hazardous. It is the responsibility of reservoir owners to ensure the integrity and safety of these structures. To aid in preparedness, the NRW provides access to flood maps via their flood map viewer, which illustrates the potential extent of flooding should a reservoir fail. Additionally, CC holds the duty of developing and maintaining offsite reservoir flood plans, which are crucial for effective response to any reservoir flood incidents. The Strategic Environmental Assessment (SEA) must establish explicit objectives, measures, and actions. These guidelines will govern how Cardiff County Council (CCC), as both a reservoir owner and the Local Lead Flood Authority (LLFA), manages reservoir flood risks to mitigate its own flood exposure and ensures robust emergency planning.

1.8.6 Pre-existing flood risk assets

Cardiff's Flood Risk Management Plan outlines the strategies for managing flood risks.[67] CC's Emergency Management Unit has robust plans for flood emergencies, regularly testing readiness with all council sectors and emergency services. They also advise local entities on flood mitigation. The highways service maintains drainage infrastructure through regular cleanings and inspections. Ongoing assessments determine the need for investments in flood risk reduction, funded by various sources including government grants.

The NRW's National Coastal Erosion Risk Management Map[68] indicate areas which are vulnerable to coastal erosion, and Shoreline Management Plans set out a shared strategic approach for managing the coastline from coastal flooding and erosion risks[69]. The creation and use of shoreline management plans in Cardiff help to mitigate and manage the risks associated with coastal erosion. Future changes, such as sea-level rise and increased storm frequency, can be predicted and recommendations can be put in place for protection. This could include maintaining or reinforcing existing defences, ensuring new developments are set back form vulnerable areas, and coordinating stakeholders to ensure collaborative efforts.

1.9 Material Assets

1.9.1 Baseline Information

This section outlines the material assets in Cardiff, including housing, economy, mineral resources and transport infrastructure. The information in this section is primarily taken from ONS.

1.9.2 Housing

Cardiff is the largest local authority in Wales with a population of 362,300 in 2021 and 156,264 households in 2020[70]. As of 2023 there were 14,159 social housing dwellings in Cardiff which was the largest number in a single local authority across Wales[71].

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[67] Cardiff FRMP (2015) Cardiff Flood Risk Management Plan https://www.cardiff.gov.uk/ENG/resident/Community-safety/Flood-and-Coastal-Erosion-Risk-Management/Flood-Risk-Management-Plan/Pages/default.aspx

[68] NRW. National Coastal Erosion Risk Management map. Available from: Natural Resources Wales / Check your coastal erosion risk (National Coastal Erosion Risk Management map).

[69] NRW. Shoreline Management Plans. Available from: Natural Resources Wales / Shoreline Management Plans

[70] StatsWales (2020). Households by Local Authority and year. [Online] Available at: https://statswales.gov.wales/Catalogue/Housing/Households/Estimates/households-by-localauthority-year

[71] StatsWales (2023). Total social housing stock by local authority and provider type. [Online] Available at: https://statswales.gov.wales/Catalogue/Housing/Social-Housing-Stock-and-Rents/totalsocialhousingstock-by-area-providertype

The median house price paid in the year ending March 2023 in Cardiff was £257,500. This is less than the England and Wales median (£285,000) and the regional median for Wales (£200,000)[72]. Housing affordability estimates are calculated by dividing house prices by annual earnings to create a ratio. The housing affordability ratio for Cardiff in 2023 is 7.3 which is worse than the Wales average of 6.1. Housing affordability in Cardiff has improved from a high of 8.3 in 2021 but it is still higher than 10 years ago (6.3)[73].

According to the PSB, there are approximately 273,000 properties at flood risk within Wales, according to recent updates to properties at flood risk data. According to latest NRW figures, 12,000 residential properties in Cardiff are at risk of tidal flooding, 17,000 are at risk of fluvial flooding and 7,000 are at risk of surface water flooding, with around 33,000 properties predicted to be threatened by 2050. This equates to 17% of properties being at risk in the area, an increase from 15% in 2020[74]. Past patterns of land use have exacerbated River Ely's vulnerability to flood risk, which is further increased by climate change.

1.9.3 Economic Activity

The proportion of the population of Cardiff aged 16 to 64 that were economically active in 2023 was 79% which was higher than the average for Wales (77%). Of those that were economically inactive 33.8% were students which is greater than the Wales average (23%). Cardiff's unemployment rate in 2023 was 5% which was higher than the average for Wales (3.7%)[75]. The most common employment industry in Cardiff in 2022 was human health and social work activities at 12.6% which was lower than the Wales average (15.4%). The next largest areas were wholesale and retail trade; repair of motor vehicles and motorcycles (10.8%) which was also lower than the Wales average (13.2%) and education (10.4%) which was higher than the Wales average (9.1%).

1.9.4 Mineral Resources

Cardiff is historically one of the largest producers and consumers of minerals in the region. The area still provides essential raw materials for construction and industry. Natural materials include quarried hard rock (carboniferous limestone and dolomite) and dredged sand landed at Cardiff Docks. There is a sand and gravel resource in the east of the city and coal resources north-west of the local authority area[76].

The following quarries are located within Cardiff[77]:

- Taffs Well Quarry
- Ton Mawr Quarry
- Creigiau Quarry
- Blaengwynlais Quarry

1.9.5 Transport Infrastructure

Cardiff is reasonably well connected to the surrounding towns and cities in South Wales with further connections to England via road and rail. The M4 motorway connects Cardiff to towns and other cities in the

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[72] Office for National Statistics (2023) Median house prices for administrative geographies HSPSS dataset 9. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/housing/datasets/medianhousepricefornationalandsubnationalgeographiesquarterlyrollingyearhpssadataset09

[73] Office for National Statistics (2024) Housing affordability in England and Wales: 2023. [Online] Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/housing/bulletins/housingaffordabilityinenglandandwales/2023

[74] Lewis, C., (2023) Cardiff faces highest flood risk in UK – why is this and how is it being tackled? The Cardiffian. [Online] Available at: https://cardiffjournalism.co.uk/thecardiffian/2023/01/20/cardiff-faces-highest-flood-risk-in-uk-why-is-this-and-how-is-it-being-tackled/

[75] Office for National Statistics (2023) Labour Market Profile – Cardiff. [Online] Available at: https://www.nomisweb.co.uk/reports/lmp/la/1946157397/printable.aspx

[76] Cardiff Council (2009) Cardiff Deoposit Local Development Plan 2006-2021 Background Paper No.4 Minerals. Available at: https://cardiff-consult.objective.co.uk/file/709851

[77] Welsh Government (2019) Existing Mineral Sites in Wales. [Online] Available at: https://www.gov.wales/sites/default/files/publications/2019-08/maps-05-minerals-and-waste-sites.pdf

UK. The A48(M) motorway connects the city centre with Cardiff suburbs where it becomes the A48 which traverses through the city. The A4232 (Peripheral Distributor Road) plays an important role in connecting Cardiff to other towns and the M4 to the west and forms part of the Cardiff ring road system.

Public transportation provision in CC is provided by a combination of bus and rail services. Cardiff public bus service connects areas of CC and the neighbouring towns including Penarth and Barry[78]. A number of bus routes connect key areas of the city including Cardiff Bay, Heath Hospital and Llanrumney. There are 20 railway stations in Cardiff which form part of the South Wales Metro with Cardiff Central and Cardiff Queen Street being the main central hubs in the city. There is also a shuttle train between Cardiff Queen Street and Cardiff Bay as well as regular services throughout the city and towards the South Wales valleys. Trains from Cardiff Central station link to the Vale of Glamorgan and Southwest Wales.

Cardiff is a relatively compact and flat city with large parts of the city centre being pedestrianised making it easy to travel by foot or by bike. Cycle paths like the Taff Trail provide traffic-free bike routes through the city. Improvements to active travel opportunities and public transportation are laid out in CC's Transport White Paper: Transport Vision to 2030[79], Cardiff Bus Priority Plan 2024-2030[80], and Transport for Wales' Climate Adaptation and Resilience Plan[81].

1.9.6 Climate change

The Climate Change Risk Assessment 3 (CCRA3) summary for Wales has identified a number of receptors that would be at risk of the effects of increased flooding as a result of climate change[61]. These risks include:

- Increased severity and frequency of flooding on homes, communities, and businesses;
- Increased severity and frequency of coastal flooding, sea level rise and erosion on coastal businesses;
- Increased frequency of flooding and coastal erosion impacting infrastructure services, including energy, transport, water and information and communication technologies.

Given the severity and frequency of these risks to receptors the CCRA has indicated that they require more action.

1.10 Cultural Heritage

1.10.1 World Heritage Sites (WHS)

There are no UNESCO World Heritage Sites (WHS) in Cardiff. There are four WHS in Wales and they are located in both the north and northwest Wales.

1.10.2 Historic Landscape Characterisation

In Wales, the most important and best surviving historic landscapes have been identified on the Register of Landscapes of Historic Interest. Cadw, the Countryside Council for Wales (CCW) and the International Council of Monuments and Sites work together to identifies two types of historic landscape:

- Outstanding Historic Landscape Areas;
- Registered Historic Landscape Areas.

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[78] Visit Cardiff. Travel Around Cardiff. [Online] Available at: https://www.visitcardiff.com/visitor-info/travel-around/

[79] Cardiff Council. Transport White Paper: Transport Vision to 2030. Available at: Transport White Paper (cardiff.gov.uk)

[80] Cardiff Council. Cardiff Bus Priority Plan 2024-2030. Available at: <AECOM Report> (moderngov.co.uk)

[81] Transport for Wales. Climate adaptation and resilience plan. Available at: Climate adaptation and resilience plan | Transport for Wales (tfw.wales)

Cardiff has one large area to the east of the Plan area which has been identified as a Registered Historic Landscape which is the Gwent Levels which provides a uniquely rich archaeological and historical resource for Wales and is of international importance and significance[82].

1.10.3 Listed Buildings

There are around 1,000 listed buildings in Cardiff as shown in Figure 15. These buildings are given a listing by Cadw to ensure that their special architectural or historic interest is fully recognised in the planning system. Listed Building Consent is needed when a proposed alteration or extension affects the character of a listed building, or those in its curtilage. A Historic Impact Statement is required for all Listed Building Consent applications [83].

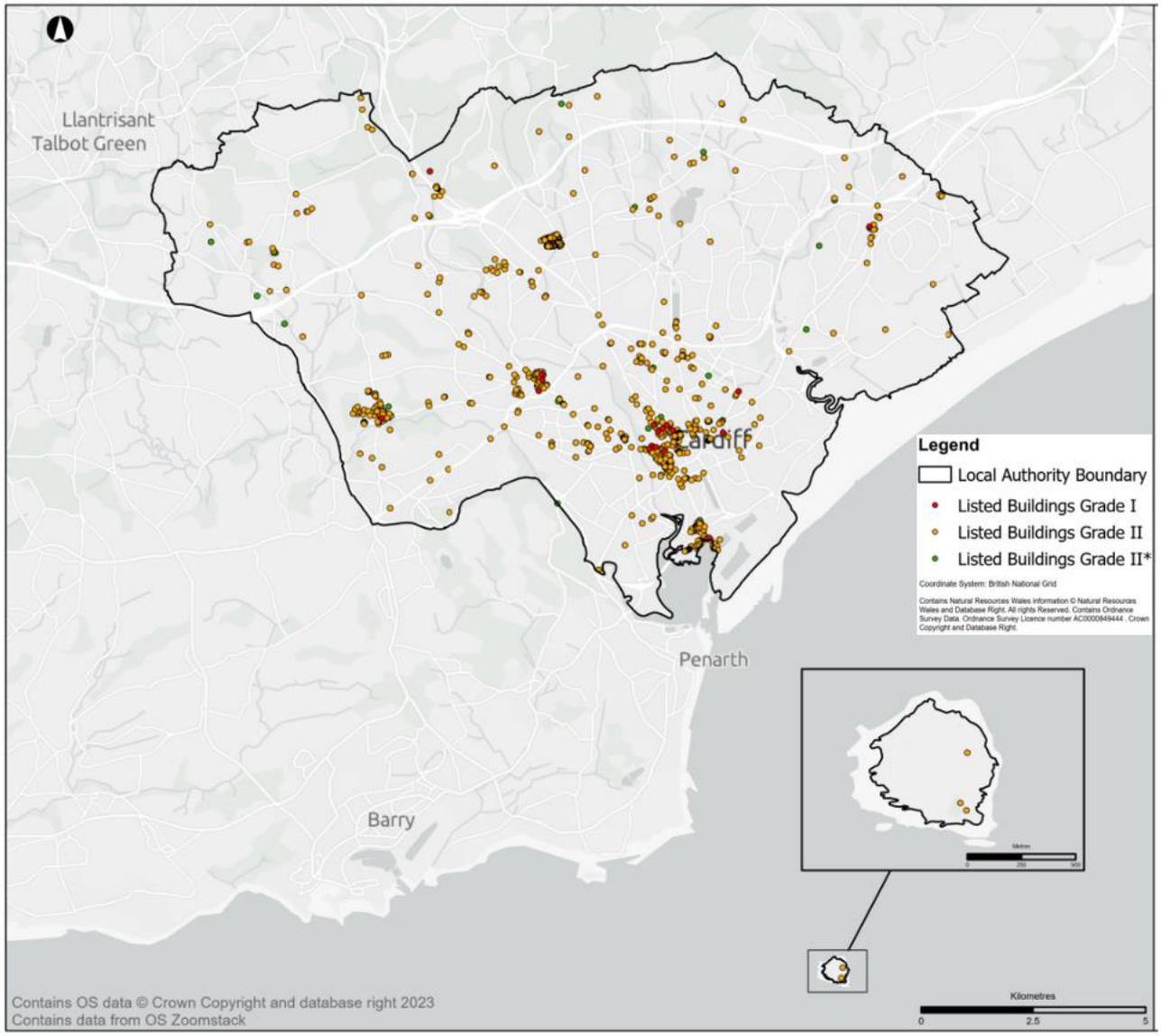

Figure 15 Listed Buildings in Cardiff

1.10.4 Conservation Areas

Cardiff has 27 Conservation Areas that have been designated for their special architectural or historic interest. The Conservation Areas are outlined in Figure 16. The designation of a conservation area enables

[82] CADW. Full Reports of Registered Historic Landscape. [Online] Available at: https://cadwpublic-api.azurewebsites.net/reports/historiclandscape/FullReport?lang=&id=HLW%20(Gt)%202

[83] Cardiff Council. Conservation of the built environment. [Online] Available at: https://www.cardiff.gov.uk/ENG/resident/Planning/Conservation/Pages/Conservation.aspx

the Council to monitor and guide change and to ensure that the character of the area is protected. The Conservation Areas within Cardiff vary greatly in size and character and range from the villages of St Fagans and St Mellons to more recent Edwardian suburbs. The character of a Conservation Area is not only created by individual buildings, but also by groups of buildings and the relationship and quality of the space between them. Trees, landscape quality, road layout and street scenes all contribute to the character and quality of the area[84].

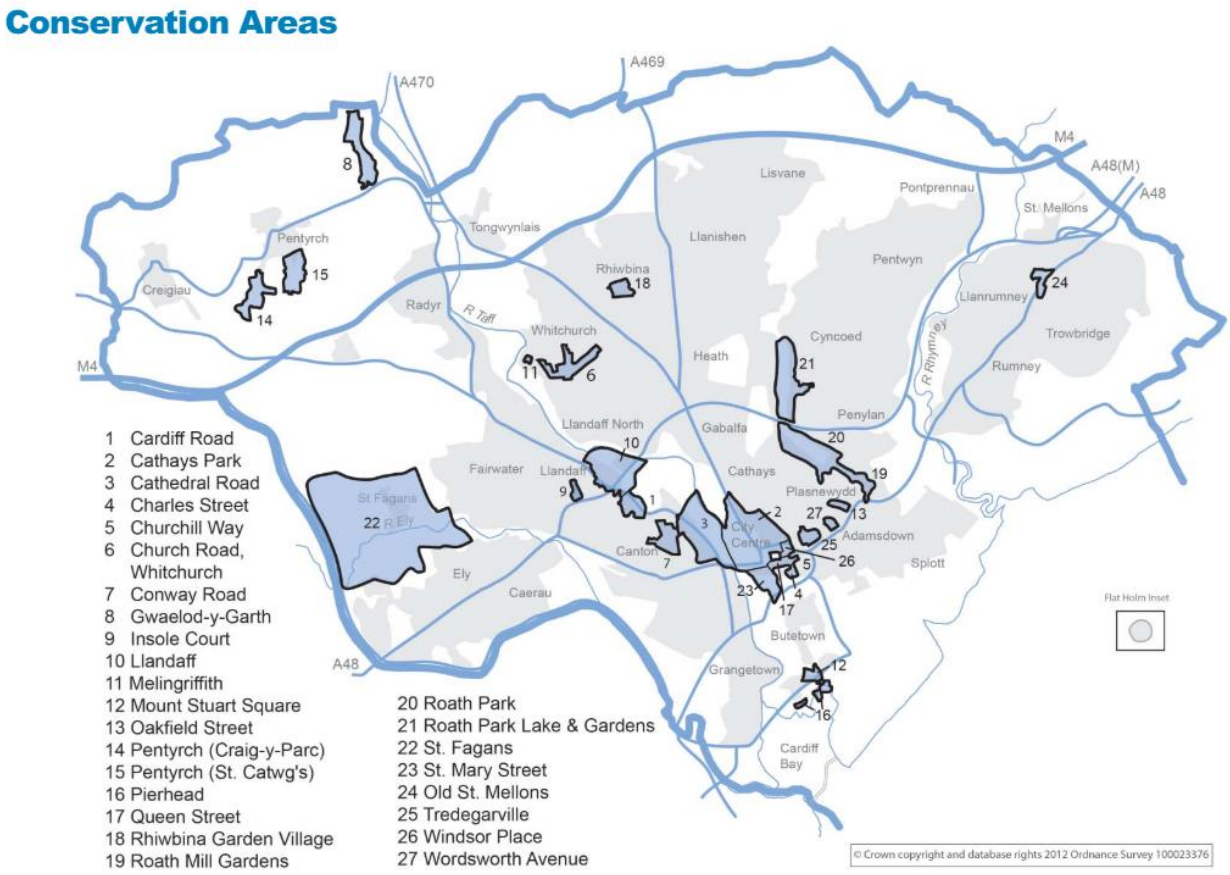

Figure 16 Conservation Areas in Cardiff[84]

1.10.5 Scheduled Ancient Monuments

Cadw has scheduled 31 Scheduled Monuments in Cardiff, ranging from prehistoric archaeology to WWII defences as shown in Figure 17. Under the Ancient Monuments and Archaeological Areas Act 1979, the Welsh Government is required to compile and maintain a schedule of monuments which are considered of national importance. These Scheduled Monuments have statutory protection and are regulated by Cadw, Welsh Government's historic environment service. Scheduled Monument Consent must be obtained before any work, alternation or controlled archaeological excavations are undertaken at a monument[85].

[84] Cardiff Council (2007). Conservation Areas. [Online] Available at: https://www.cardiff.gov.uk/ENG/resident/Planning/Documents/Conservation%20Areas.pdf

[85] Cardiff Council (2021). Scheduled Monuments. [Online] Available at: https://www.cardiff.gov.uk/ENG/resident/Planning/Documents/Scheduled%20Monuments%20%20-%20Eng.pdf

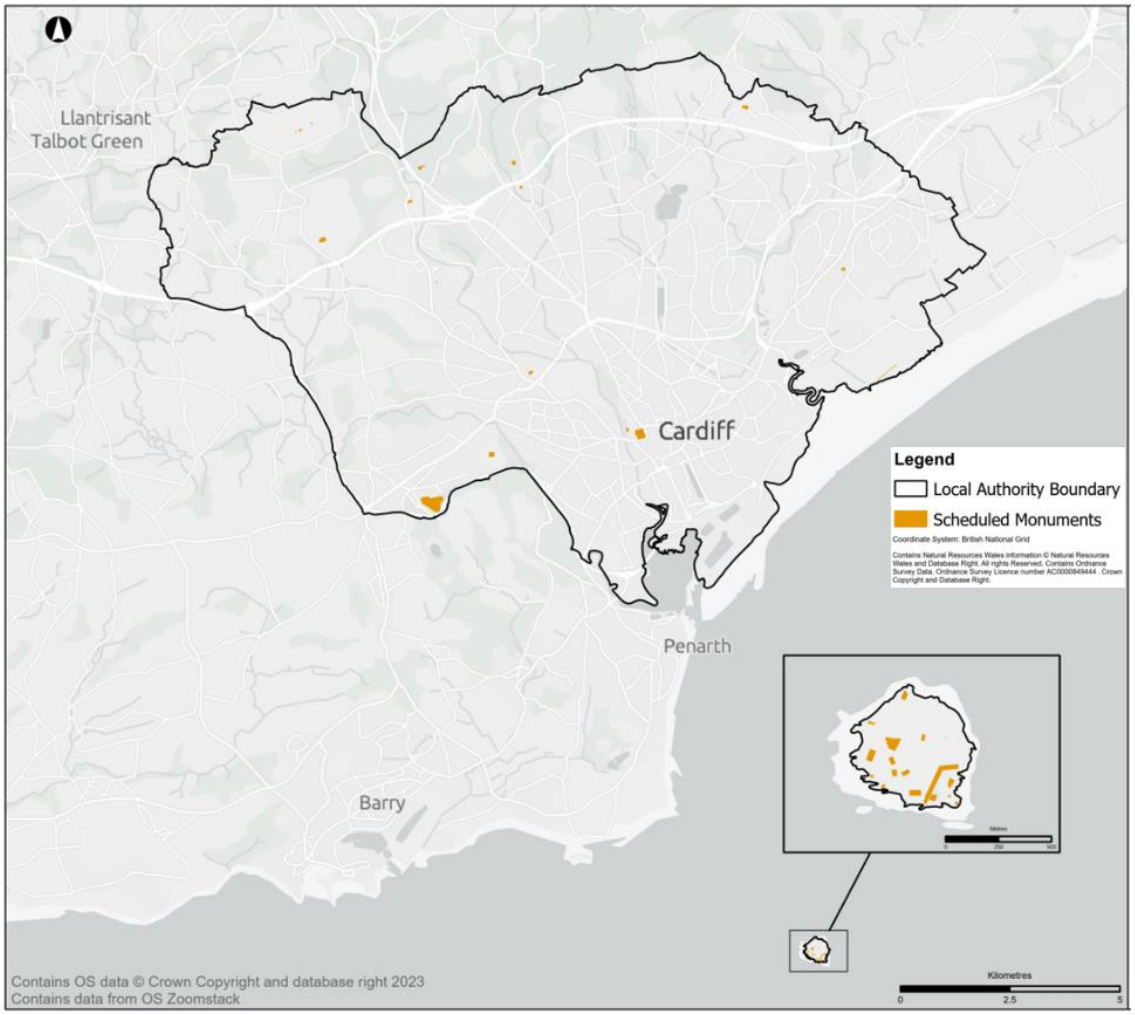

Figure 17 Scheduled Monuments in Cardiff

1.10.6 Historic Parks and Gardens

There are 18 parks and gardens in Cardiff that feature within the Cadw Register of Landscapes, Parks, and Gardens of Special Historic Interest in Wales (listed in Table 5 and illustrated in Figure 18). The statutory register provides information to help protect and conserve these special places, 12 of which are public parks.

Table 5 Historic Parks and Gardens in Cardiff

Name	Location	Site Type	Grade
Cardiff Castle and Bute Park	Cardiff	Park	I
Cathays Cemetery	Cathays	Cemetery	II*
Cathays Park	Cardiff	Park	II
Coryton House	Coryton	Garden	II
Craig-y-parc House	Pentyrch	Garden	II*
Grange Gardens	Grangetown	Urban Park	II
Insole Court	Llandaff	Garden	II*
Parc Cefn Onn	Garden	Garden	II
Pontcanna Fields and Llandaff Fields	Cardiff	Park	II*

Name	Location	Site Type	Grade
Roath Park	Roath	Urban Park	I
Rookwood Hospital	Llandaff	Garden	II
Sophia Gardens	Cardiff	Park	II
St Fagans Castle	St Fagans	Garden	I
Thompson's Park (Sir David's Field)	Canton	Urban Park	II
Ty Gwyn	Lisvane	Garden	II*
Victoria Park	Canton	Urban Park	II
Waterloo Gardens, Roath Mill Gardens and Roath Brook Gardens	Roath	Urban Park	II
Whitchurch Hospital	Whitchurch	Garden	II

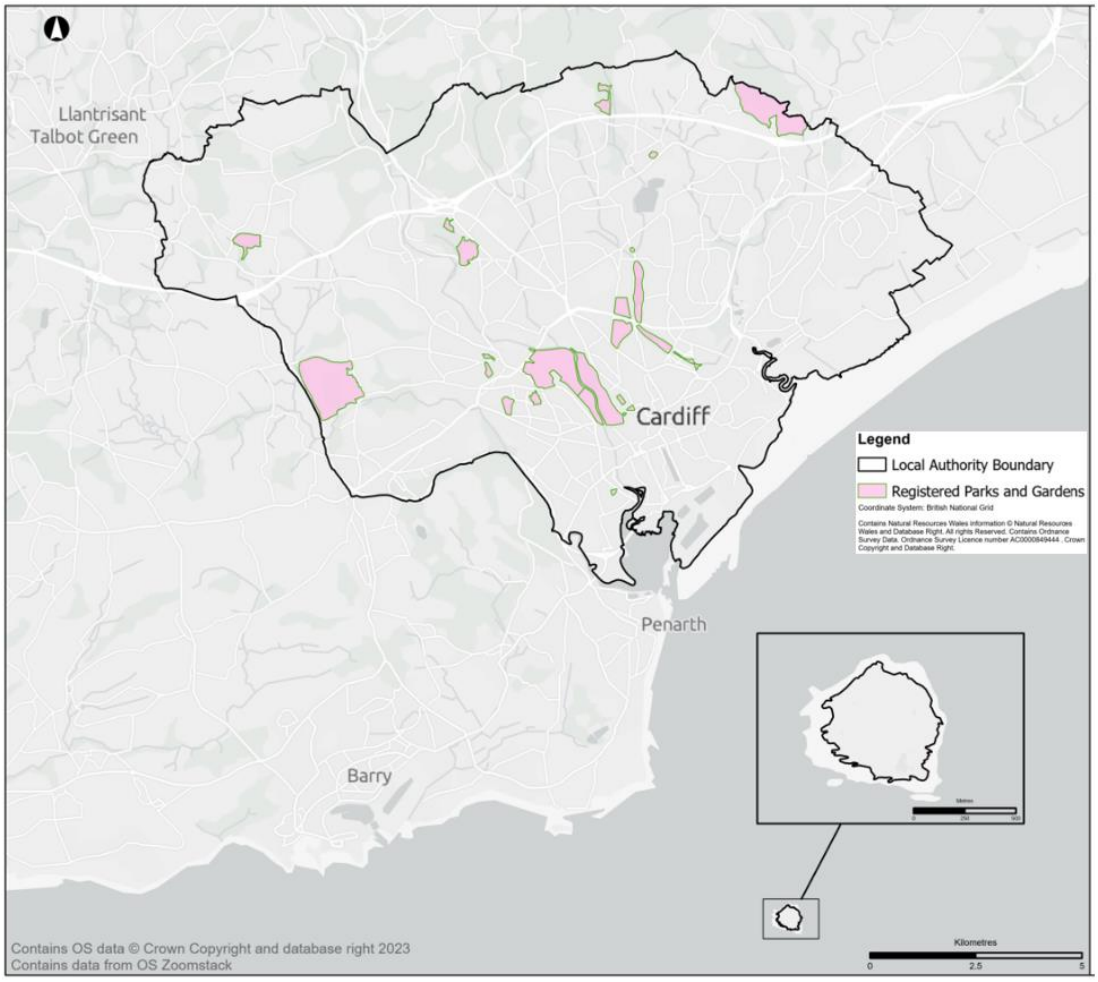

Figure 18 Historic Parks and Gardens in Cardiff

1.10.7 Non designated historic assets

It's important to acknowledge the presence of historical assets in the region that, while not formally designated, may hold national significance. Consultation with Heneb, The Trust for Welsh Archaeology—the organization responsible for managing the statutory Historic Environment Record on behalf of the Welsh Ministers—is advisable.

1.10.8 Historic Battlefields

Although Wales does not have any officially registered battlefields, an extensive Inventory of Historic Battlefields in Wales has been compiled, which documents numerous significant battle sites within the area, for example, the Battle of St Fagans.

1.11 Landscape and Visual

1.11.1 Landscape Character Areas

Cardiff has a generally varied landscape with lowland coastal landscapes to the south-east and highland valley landscapes to the north. There is a strong human influence throughout the area due to the capital city of Cardiff and surrounding suburban and industrial areas. National Landscape Character Areas (NLCA) are defined at a broad landscape scale throughout Wales by NRW. The descriptive profiles for the 48 individual character areas highlight what distinguishes one landscape from another, with reference to their regionally distinct natural, cultural, and perceptual characteristics[86]. Within the Cardiff local authority area there are 4 distinct NLCAs as shown in Figure 19 which are as follows:

1. NLCA35: Cardiff, Barry and Newport
2. NLCA36: Vale of Glamorgan
3. NLCA37: South Wales Valleys
4. NLCA34: Gwent Levels

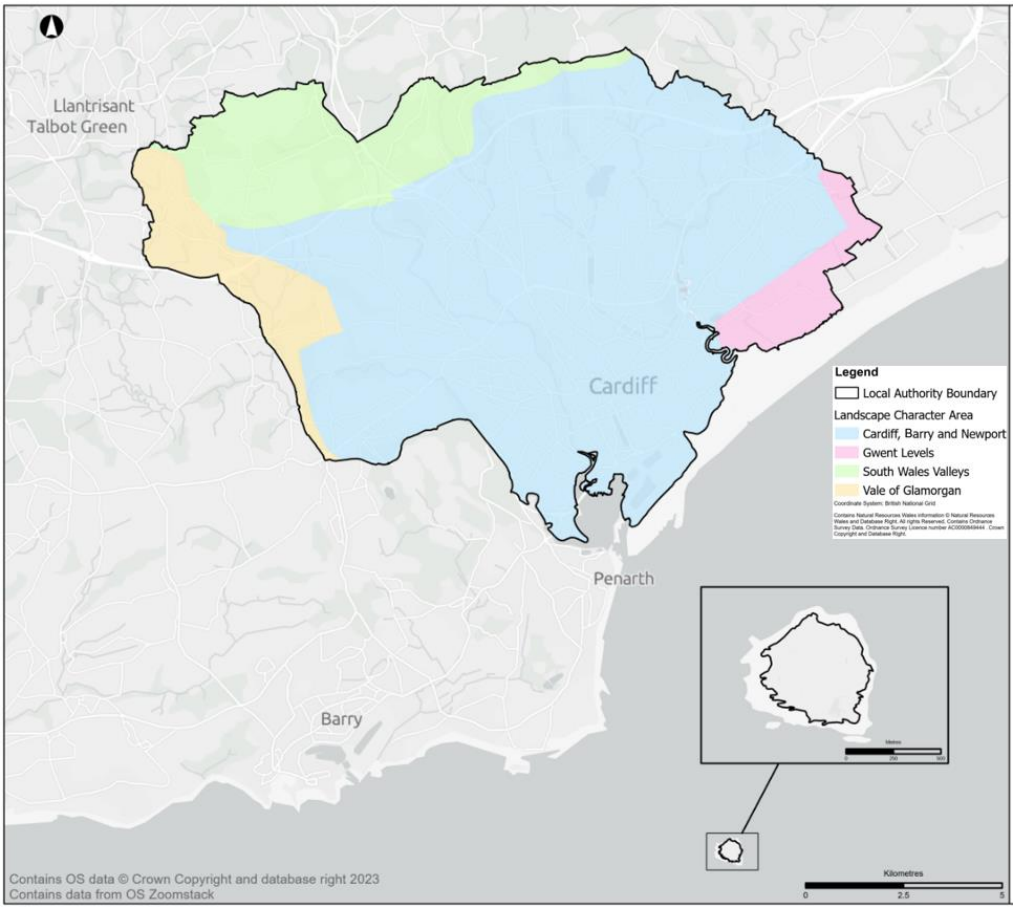

Figure 19 Landscape Character Areas in Cardiff

[86] Natural Resources Wales. National Landscape Areas (NLCA) [Online] Available at: https://naturalresources.wales/evidence-and-data/maps/nlca/?lang=en

1.11.2 Special Landscape Areas

Special Landscape Areas (SLAs) are a non-statutory designation applied by a local authority to define areas of high landscape importance within their administrative boundary[87]. There are 5 SLAs in Cardiff, as shown in Figure 20, which are:

- Flat Holm
- St Fagans Lowlands and Ely Valley
- Garth Hill and Pentyrch Ridges
- Fforest Fawr and Caerphilly Ridge
- Wentlooge Levels

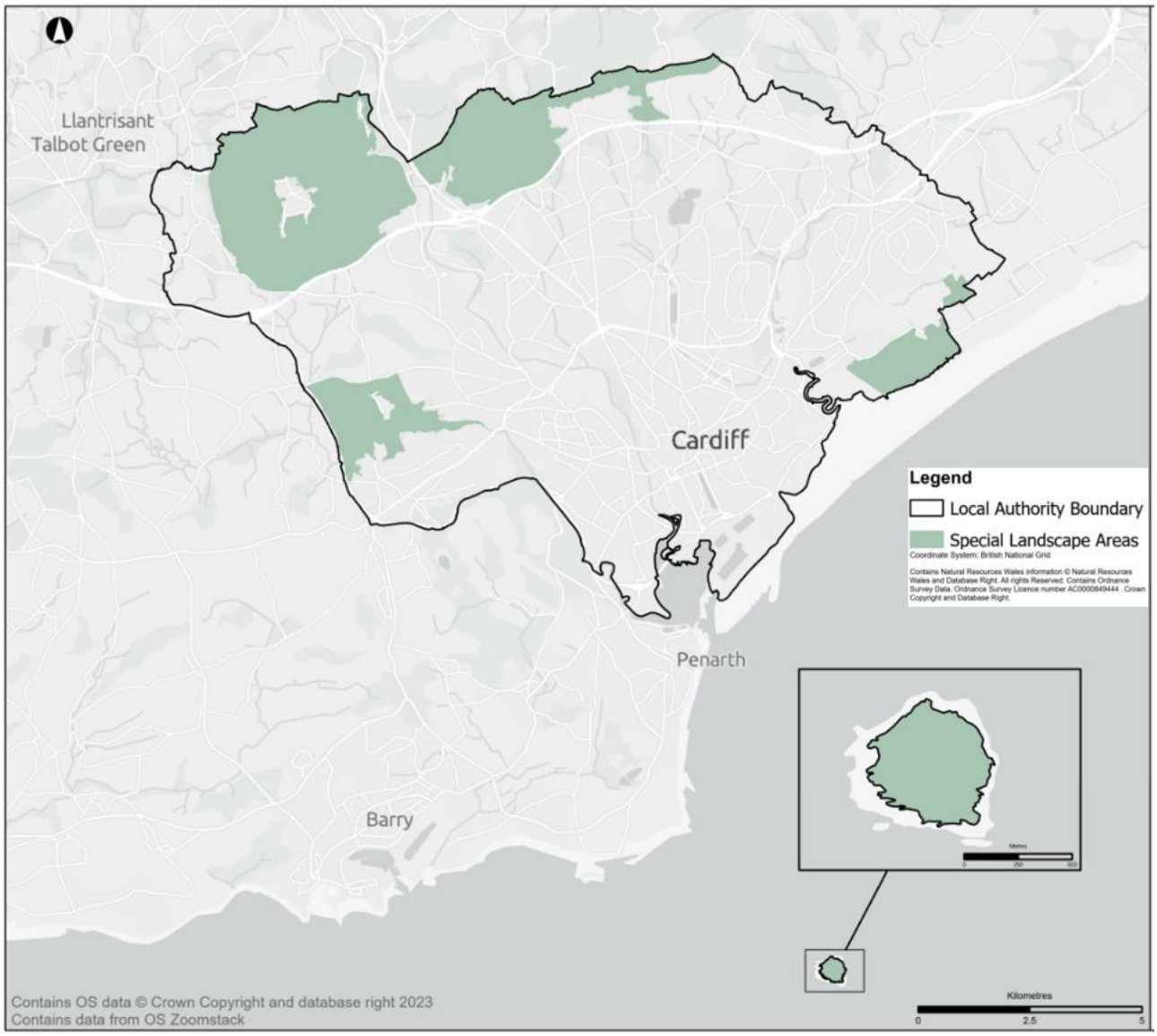

Figure 20 Special Landscape Areas in Cardiff

1.11.3 Areas of Outstanding Natural Beauty

There are no Areas of Outstanding Natural Beauty (AONBs) located within the Cardiff local authority area.

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[87] Natural Resources Wales (2023). Special Landscape Areas Wales. [Online] Available at: https://datamap.gov.wales/layers/geonode:nrw_special_landscape_area

Appendix C: Responses to the SEA Scoping Report

Table 1 NRW comments on the Draft SEA Scoping Report

Point	Comment	Response to Consultee Comment
General comments	Following recommendations: • consideration of flood risk for the present day and for climate change for each topic, rather than a separate section for flooding • the Plans, Programmes and Policies listed are not yet adequately taken account of. For instance there is no reference to the South Central Area Statement within the Scoping Report, in particular the two themes 'Restoring Ecological Resilience' and 'Working with Water' are particularly relevant and material to this plan. The themes and issues identified in the Area Statement should be built into the plan, as well key documents like the Freshwater ecosystem profile • Environmental Plan Opportunities listed in Table 8 should be revised to consider the opportunities specific to Cardiff, rather than the national scale. For example, for Biodiversity, this should consider the RENS (Nature Networks) within Cardiff rather than referring to national policy. In Climate and carbon, this should consider opportunities identified by One Planet Cardiff with multiple benefits, including green infrastructure. Details of which should be considered within Section 4 • as this is a second cycle plan, we suggest the scoping could draw more on what has been learnt from the implementation of the first cycle. What was monitored (both SEA monitoring and monitoring for the plan itself), and how have the results of the monitoring fed into the baseline data/environmental context for this round? How has the learning from the first cycle influenced this second cycle?	Consideration of flood risk for the present day and for climate change has been considered for each topic, captured through the SEA Criteria leading questions. The South Central Area Statement has been referred to in the Environmental Report (Appendix A- Plans, Programmes and Environmental Protection Objectives Table A.1.3). Reference to the two relevant themes 'Working with water' and 'Building resilient ecosystems' has been included. The Freshwater ecosystem profile is referred to in Table A.1.3 of Appendix A- Plans, Programmes and Environmental Protection Objectives. The Plan's environmental opportunities listed in Table 8 of the SEA scoping report have been reviewed and updated within Table 2 of the SEA Environmental Report. Although the Plan represents the second cycle plan it should be considered as a new document as the actions and measures set out within the 2014 LMRS were not considered suitable against current best practice and has therefore been discarded. Monitoring of the 2014 LMRS or its SEA objectives / recommendations was not undertaken.
1.1 The Flood Risk Regulations 2009	The Flood Risk Regulations 2009 legislation was revoked as part of the Retained EU Legislation Act on the 31 December 2023. It may be appropriate to note this change within this section.	This change is noted within Table A.1.2 of Appendix A- Plans, Programmes and Environmental Protection Objectives and in Section 1.1 of the SEA Environmental Report.
Figure 4	Suggestion to include: • Dŵr Cymru Welsh Water for Public Water and Sewerage • Welsh Government for highway flooding on trunk roads • NRW for Drainage Districts (part of Caldicot and Wentlooge Levels) as either separate row, or include within ordinary watercourses Regarding reservoirs, NRW's role is to perform as the enforcement authority for the Reservoirs Act 1975, whilst we seek to ensure reservoir owners observe and comply with the law, it is the owner that holds the liability to minimise that risk as low as reasonably practicable. Cardiff Council is the owner of a large raised reservoir itself, Roath Park Lake. Suggestion that the text is amended to 'Reservoir owner' rather than NRW, and includes CC's assets and further exploration of the flood risk from its reservoirs and consideration within the LFRMS's Action Plan. As a reservoir owner, CC also has the liability for responding to flood incidents which may arise from Roath Park Lake. This should be set out in a reservoir flood plan using the guidance on our website: Natural Resources Wales / Prepare a reservoir flood plan. The flood plan should be exercised and reviewed also in accordance with our guidance. Reservoir flood plans are not a statutory requirement. We provide guidance and hold an expectation that the guidance is applied by owners. CC as LLFA should also consider what it may do to ensure reservoir flood planning is promoted and also ensure that its own offsite flood plans are current.	The responsibility of CC to respond to flood incidents and set out a reservoir flood plan is included in Section 1.6 of the SEA Environmental Report, which provides the background to the draft Plan. This information has also been included within Figure 4 of the SEA Environmental Report.
2.2	Welcome reference to the climate emergency declared by CC, there should also be reference to the Nature emergency declared by CC in November 2021. Given recent updates to properties at Flood Risk data, there are approximately 273,000 properties at flood risk within Wales. Property figures are also available at the Cardiff Council scale for both present day and climate change. Please get in touch if you would like more information about this.	Property flood risk data for Wales and Cardiff have been added to Section 1.5.8 of Appendix B Baseline.
4.2. Biodiversity	Suggest reference to: **Section 6 Duty (Environment (Wales) Act 2016)** The Section 6 Duty should be noted, which requires public authorities, in carrying out their functions, to 'seek to maintain and enhance biodiversity in the exercise of functions in relation to Wales, and in so doing promote the resilience of ecosystems, so far as consistent with the proper exercise of those functions'. **S6 Biodiversity & Resilience of Ecosystems Duty (BRED) Plan** Protect and enhance ecosystem resilience (local and national) has been included in Table 2 as part of the relevant plans, programmes and objectives, suggestion to expand on how this will be achieved. **Nature Networks (RENs)** There are four Nature Networks (RENs) within Cardiff which should be noted: • Cardiff City • North Cardiff Woodlands • Gwent Levels • Ely Catchment These have been identified following the NRW REN Practitioner guidance: Natural Resources Wales / Practitioners' guide to Resilient Ecological Networks. Please contact us if you require further information.	Reference to Section 6 Duty and the Biodiversity & Resilience of Ecosystems Duty (BRED) plan has been included Section 1.2.1 of Appendix B Baseline. The four Nature Networks (RENs) within Cardiff have been noted in Nature Networks (Resilient Ecological Networks) subheading within Section 1.2.1.8 Appendix B Baseline. Reference to Nature Networks, Cardiff Local Nature Partnership have been considered within the Biodiversity Baseline in Section 1.2.1.10 of Appendix B Baseline Inclusion of Cardiff Local Nature Partnership activities in the Cardiff area in Section 1.2.1.10 of Appendix B Baseline. The baseline section has been updated to reflect the fish information provided by NRW. This has been included within Section 1.2.2.1 of Appendix B Baseline.

Point	Comment	Response to Consultee Comment
	Cardiff Local Nature Partnership The work of Cardiff's Local Nature Partnership for green and blue spaces should be noted, including progress to draft a Nature Recovery Action Plan for Cardiff by Autumn 2024, with a final version published by March 2025. Other activities in the Cardiff area The below should be included in the baseline information and opportunities: • Aspiring to become a National Park City - Cardiff National Park City • Coed Caerdydd is a 10 year programme to increase the number of trees in Cardiff, supporting the city's One Planet climate change strategy • Existing SUDs projects in the area like Greener Grangetown, and the known monitoring and benefits following that scheme, and reference to any future planned work by DCWW **Fish** Potential impact to fish needs to be explored and to note Section 7 Species from the Environment Wales (2016) Act, Brown Trout, European Eel and Atlantic Salmon should be included. There are several legislative drivers which there are statutory requirements to have regard and should be highlighted in the SEA – SAFFA 1975, Eel Regs 2009 and Environment Wales Section 7 species. This is in addition to the WFD requirement to ensure all aspects of the water environment are protected and, where necessary, restore water bodies in order to reach good status, and to prevent deterioration. Work within the river Taff downstream of NGR ST 17761 76508 can only take place in January and March (inclusive). This is primarily to avoid disturbing salmonids that are entering the river from the sea but is also to avoid disturbing salmonid smolts that are heading for the sea. Upstream of this location work can only take place between the 15th of May and the 15th of October and is primarily to avoid disturbing spawning salmonids, their spawning grounds, and juveniles before they become mobile. It is important to note that it is possible to commit an offence under the Salmon and Freshwater Fisheries Act (1975) to work during these embargo periods. If an area of the river is to be sealed off and drained down (in order to create a dry working area), then a fish-rescue must be carried out by suitably competent people. Note, however, that this may require formal consent from the local NRW Fisheries Officer, Craig Pooley.	
	Invasive Non-Native Species (INNS) and biosecurity We recommend including baseline evidence on INNS given the risk of Non-native invasive species alongside watercourses and their spread, the potential for such plants to impede flow especially on smaller watercourses and the benefits for their management. To help prevent the spread of crayfish plague or other biosecurity risks, please follow the "Check, Clean, Dry" protocol if entering waterways: check equipment and clothing for mud and debris, clean everything thoroughly, and dry items completely before entering other waterbodies.	The baseline section has been updated to reflect Invasive Non-Native Species (INNS) and inclusion of the "Check, Clean, Dry". This has been included within Section 1.2.2.2 of Appendix B Baseline.
	River Restoration We are currently looking into River Restoration opportunities across Cardiff, considering multiple benefits including flood risk, misconnections, diffuse pollution, and water quality. There are River Restoration Plans for the Ely, Nant Glandulais, Rhymney, Roath Brook, and Whitchurch Brook – there are pressures and opportunities highlighted here, these should be considered in this scoping report. Cardiff PSB's Local Wellbeing Plan Annual Report 2023/24 has highlighted the work on Rivers through the partnership and the wider River Restoration as contributing to integrated improvements in the area – this scoping report should be joined up with this work. **The Ely Partnership** The Ely Partnership has a vision and is a way to work collaboratively for catchment wide benefits. Given Cardiff is at the bottom of the catchment, working with the partnership and taking on board the recommendations of the group is important. A Natural Capital Assessment was completed. This Assessment would provide good evidence and information to inform the SEA looking at ecosystem services. This is the vision of the Ely Partnership, which was collaboratively created: • The River Ely is an ecologically resilient catchment, being an important wildlife corridor throughout the landscape, connecting habitats and supporting species movement. • The River Ely is a valued and respected part of the landscape, for the enjoyment, wellbeing and resilience of local communities living and working within the catchment. • The natural capital of the catchment is understood, valued, and enhanced through decision making from local to regional actions.	Reference to Cardiff PSB's Local Wellbeing Plan Annual Report 2023/24 has been included in the Section 1.2.2.3 (Geomorphology of the Biodiversity) of Appendix B Baseline.
4.2. Biodiversity	**Geomorphology/Hydro-morphology** There should be specific mention of Geomorphology/Hydro morphology - protections and restoration of geomorphology is essential to building or resilience of ecosystems. Given the significant urban pressures geomorphology consideration is essential for climate and ecosystem resilience. **Shoreline Management Plan and Coastal erosion** Reference should be made to the Shoreline Management Plan and associated policy units and consider any ecological habitats that coastal squeeze may impact (e.g. saltmarsh).	Geomorphology / hydro- morphology has been included in Section 1.2.2.3 of Appendix B Baseline. The Cardiff Council Shoreline Management Plan is included Table A.4 of Appendix A Plans, Programmes and Environmental Protection Objectives. The River Ely River Restoration Plan has been considered within Section 1.5.2 Water Resources of Appendix B Baseline.
4.3 Population	Suggestion to include: • Figures for how many people within CC are within a flood risk area or at risk of coastal erosion in the present day, and considering climate change • Baseline information on homelessness, languages spoken, physical and mental health well-being or reported issues linked to flooding (if known) within CC • Details on projected population growth, please refer to OPC action plan.pdf (oneplanetcardiff.co.uk) where Cardiff is expected to be the fastest-growing major UK City	Languages spoken, physical and mental wellbeing and homelessness are in Section 1.3.2 of Appendix B Baseline.

Point	Comment	Response to Consultee Comment
4.3 Population	Suggestion for further considerations: • Given evidence that those in the most deprived areas are more likely to be vulnerable to climate risks of flooding, heatwaves, and have a reduced capacity to cope/recover. Consider how this would impact overcrowding, homelessness, those living in income poverty • Please refer to Public Health Wales - Health Impact Assessment Climate Change Given baseline population information for CC, what consideration is needed for the associated LFRMS and SEA Objectives and Measures (e.g., for CDFA1 tailored advice to those living in overcrowded conditions)	Further consideration of the potential effects on those more vulnerable to climatic risks has been considered as part of the SEA.
4.4 Soil, Geology and Contaminated Land	• Whilst there is only a very small peat resource in Cardiff, we recommend that baseline information regarding peatland should be included, to enable the opportunity described on page 40. The Wales Environmental Information Portal contains the new peat map showing the locations of all Peatlands in Wales. We are happy to discuss this. • Include history of coal mining in the area and include reference of disused coal tips within CC boundaries Coal tip safety GOV.WALES • Suggest more explanation of how the type of bedrock influences the risk of flooding within CC (for example, flashy and reactive catchments) • Suggest analysis of whether any contaminated land is at risk of flooding and coastal erosion • There is an opportunity for nature-based solutions to reduce soil erosion, as well as flood risk and wider benefits There should be specific mention of Geomorphology/Hydro morphology - protections and restoration of geomorphology is essential to building or resilience of ecosystems. Given the significant urban pressures geomorphology consideration is essential for climate and ecosystem resilience.	Comments relating to Soil in NRW have been considered within the SEA. Peat resource and the Peatlands map are referenced in Section 1.4.2 of Appendix B Baseline. History of coal mining and coal tip safety is referenced in Section 1.4.3 of Appendix B Baseline. Geomorphology/hydro morphology comments has been addressed in Section 1.2.2.3 of Appendix B Baseline and considered through the SEA assessment.
4.5 Water	• There is currently no reference of flood risk within the water section, this needs to be updated. • Suggestion to include further description of main rivers and ordinary watercourses within the section, and given focus of LFRMS and associated contents would focus on ordinary watercourses, surface water and groundwater • Recreation amenity not yet been considered and the recent DCWW development of Llanishen and Lisvane reservoirs has not been mentioned. The designated sites at these locations are included but there is a large recreational amenity for the population of North Cardiff and beyond provided by DCWW. This also links to Population and Health. • Update reference of Brecon Beacons to Bannau Brycheniog Update 'South East Valleys River Basin Catchment' in 4.5.2 to 'South East Valleys Management Catchment'.	Flood Risk has been considered within Sections 1.5.8 Water and Section 1.8 Flooding within Appendix B Baseline. References to Brecon Beacons have been removed and updated to reflect Bannau Brycheniog. South East Valleys River Basin Catchment has been updated to South East Valleys Management Catchment in Section 1.5.2 of Appendix B Baseline. Further description of River Ely, Taff and Rhymney have been included in Section 1.5.2 of Appendix B Baseline.
Water Resources in NRW	Natural Resources Wales is the regulatory body responsible for managing water resources in Wales. We need to balance the water needs of the environment, society, and the economy, both now and in the future. We face a number of challenges which will have an impact on our water resources and the ways we manage them. These include population growth, an increased demand for water and climate change. Limited mention of Water Resources, but more focus on the Water Framework Directive. This relates more to water quality than water quantity. The Water Act is the Legislation that drives the management of our water resources. Inclusion of other relevant plans and policies needs consideration including our Abstraction Licensing Strategies (ALS), this strategy assesses applications to abstract and/or impound water against local water availability. **Abstraction Licensing Strategies (ALS)** Cardiff sits within the South East Valleys Abstraction Licensing Strategy. This Licensing Strategy sets out how water resources are managed in the South East Valleys catchments. It provides information about where water is available for abstraction and an indication of how reliable a new abstraction license may be. sev-licensing-strategy-final-nov-17.pdf (cyfoethnaturiol.cymru) Public water supply accounts for 53% of the total annual abstraction. The main pressures on water resources are centred on several public water supply reservoirs at the top of the Taff, Rhymney, Rhondda, Cynon, and Ebbw catchments, the maintenance of Cardiff Bay and the large unlicensed dock feeder abstractions from the downstream end of the Rivers Taff and Ebbw. All the South East Valleys rivers eventually flow into the Severn Estuary. The Severn Estuary is designated as a: • Ramsar site (Ramsar Convention on Wetlands of International Importance Especially as waterfowl Habitat) • Special Protection Area (SPA) (EC Birds Directive 1979) • Special Area of Conservation (SAC) (EC Habitats Directive 1992) • Site of Special Scientific Interest (SSSI) (Wildlife and Countryside Act 1981(as amended)) The River Taff flows into Cardiff Bay up to Abercycnon and the tributary river catchments Rhondda Fawr, Rhondda Fach, Nant Clydach and Afon Cynon - We have concerns over the degree of existing licensed abstraction on low river flows and the effect of reservoirs in the headwater catchments on river flows. As a result, water is only available for new consumptive abstraction at medium to high river flows. There are flow pressures in the Nant Glandulas as a result of existing licensed abstractions. There is restricted water available for further abstraction, with no water available at low or medium range flows. We also have concerns about the pressure on flows within Roath brook from existing licensed abstraction.	Consideration of abstractions and abstraction licensing strategies have been included in Section 1.5.2 Water Resources of Appendix B Baseline.
	Cardiff Bay (Rivers Taff & Ely) The Cardiff Bay Barrage impounds the Rivers Taff and Ely. In accordance with provisions within the Cardiff Bay Barrage Act 1993, the operators of the barrage, Cardiff City Council, aim to maintain the bay level at a near constant level of about 4.5m above OD; this is managed through operation of 1 or more of the 5 sluice gates. When tide levels are higher than the bay level, the sluices are closed to prevent saline incursion into the freshwater bay. During these 'tide- lock' events, the bay stores river flows; when the tide level falls to below that of the bay, the sluices are opened to return the bay level to the required height. Certain barrage operations require a supply of freshwater such as the provision of a constant flow for the	Cardiff Bay and Gwent Levels water levels are included in Sections 1.5.6 and 1.5.7 of Appendix B Baseline. Consideration of the South-East Wales Conjunctive Use System (SEWCUS) and water supply has been included within Section 1.5.2 of Appendix B Baseline.

<table>
<tr><th>Point</th><th>Comment</th><th>Response to Consultee Comment</th></tr>
<tr><td></td><td>fish pass and the regular use of navigation locks. There is an operating agreement that governs apportionment of available water amongst the different users at the barrage during low flow periods. Combined river flow volumes below a certain threshold are therefore fully allocated.

Gwent Levels

There are small reclaimed low-lying coastal plains within the South East Valleys area that are water level dependent, collectively known as the Caldicot and Wentlooge Levels. Overall, the Gwent Levels span from west to east between Cardiff and Chepstow along the low lying plain of the Severn Estuary of which the Caldicot and Wentlooge Levels are part of. The Levels are managed by NRW in a way that supports a variety of functions, including land drainage, reducing flood risk, agriculture, conservation, and development. Abstraction is managed in the Levels as reducing the amount of water available in this managed water system could lower the water table, resulting in the risk of land subsidence.

Water Supply – DCWW

South East Wales Conjunctive Use System (SEWCUS) - The water supply for South Wales is currently delivered in a number of water supply areas the largest being the South East Wales Conjunctive Use System which distributes the water from 12 water treatment works to the Newport and Cardiff and South East Wales valleys areas.</td><td></td></tr>
<tr><td></td><td>Reservoirs

Importance of the reservoirs – these are outside of the LFRMS area but would affect the water resources further downstream. The main pressures on water resources within the South East Valleys area are centered on several public water supply reservoirs at the top of the Taff, Rhymney, Rhondda, Cynon, and Ebbw catchments.</td><td>Comments noted and considered within the SEA</td></tr>
<tr><td>Water Framework Directive</td><td>A LFRMS has the opportunity to be detrimental or beneficial to implementing WFD mitigation measures.

FRM activities do contribute to WFD failures due to physical modifications so there should be an issue/opportunity for the LFRMS to make efforts address this.

Opportunities to work collaboratively on nature based solutions for wider benefits, including flood risk, should be considered.

All projects being undertaken in the fluvial, estuarine, or coastal environment must undergo WFD compliance assessment. This should be considered and referenced, please refer to WFD Advice Note for Local Authorities (naturalresources.wales).

Heavily Modified Waterbodies (HMWB) in CC should be included in the baseline information. Some waterbodies might be classified as a HMWB as a result of their function as a flood risk asset. These might provide valuable social and economic benefits which it is vitally important to protect, so they have been designated as such under Article 4.3 of the WFD. There can still be opportunities to deliver mitigation measures in HMWB to help achieve Good Ecological Potential. Where FRMP measures are delivered in a HMWB, must seek opportunities to deliver mitigation measures identified for the HMWB.

There should be specific mention of Geomorphology/Hydro morphology - protections and restoration of geomorphology is essential to building or resilience of ecosystems. Given the significant urban pressures geomorphology consideration is essential for climate and ecosystem resilience. One of the primary Reasons for failure of waterbodies under WFD in Wales and particularly in Cardiff is the physical modification of watercourses and the disconnection with their floodplains and riparian corridors. Physical modifications are not just about fish passage, but is a core element to the function of watercourses alongside water quality and quantity. Maintaining and in most cases in Cardiff waterbodies there is a need to improve/restore geomorphology in order to improve habitat and natural processes. Without restoration of geomorphology habitats for fish and invertebrates cannot be sustained or present or can lead to increased erosion and deposition which can impact flooding and water quality. This is not considered at any point in the SEA. There is a summary in the RBMP on physical Modifications and Morphology

There is no mention of Opportunity Catchments – this is a focus for the current RBMP round – the Taff and Ely are focus catchments – this is a key omission to the SEA. Overview of the Taff and Ely Opportunity Catchment is included in the Welsh part of the Severn RBMP 21-27 summary.

An Ely Valley Overview which covers WFD for the Ely has been included as a separate attachment.

Please update the following:
mitigation measures should be included for Cardiff Bay as a failing element
two waterbodies are missing from Table 6
Nant Clun - source to conf Ely R
Whitchurch Canal
the failing elements listed in Table 6. This is the correct list:
<table>
<tr><th></th><th></th><th></th></tr>
<tr><td>GB10905602677 0</td><td>Rhosog Fach Reen - source to Seven Estuary</td><td>Invertebrates, Ammonia, Dissolved Oxygen, Phosphate, Mitigation Measures Assessment</td></tr>
<tr><td>GB10905702708 0</td><td>Nant Dowlais - source to conf Ely R</td><td>Fish, Phosphate</td></tr>
<tr><td>GB10905702710 0</td><td>Nant Clun - source to conf Ely R</td><td>Fish, Invertebrates</td></tr>
<tr><td>GB10905702715 0</td><td>Roath Brook</td><td>Invertebrates, Mac_Phyto (Macrophytes), Phosphate, Mitigation Measures Assessment</td></tr>
<tr><td>GB10905702716 0</td><td>Nant Glandulas - source to conf Rhymney R</td><td>Fish, Mac_Phyto (diatoms), Hydrological regime, Mitigation Measures Assessment</td></tr>
</table></td><td>Comments noted and considered within the SEA.

A WFD Screening assessment has been completed and will be submitted alongside the draft Plan.

HMWBs in CC have been included in the baseline information in the SEA Scoping Report and WFD Screening Assessment.

The WFD Screening Assessment has noted potential for both positive and negative impacts upon hydromorphology.

Opportunity Catchments are now noted in the WFD Screening Assessment.

Associated tables have been updated within Section 1.5.4 of Appendix B Baseline.</td></tr>
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<tr><th>Point</th><th>Comment</th><th>Response to Consultee Comment</th></tr>
<tr><td></td><td>
<table>
<tr><td>GB10905702722 0</td><td>Whitchurch Bk - source to conf R Taff</td><td>Phosphate, Mitigation Measures Assessment</td></tr>
<tr><td>GB10905702726 0</td><td>Ely R - conf Nant Clun to Allot Gardens, Ely</td><td>Polyaromatic hydrocarbons (PAH), Fish, Invertebrates, Phosphate</td></tr>
<tr><td>GB10905702727 0</td><td>Taff - conf Rhondda R to Castle Street</td><td>Polyaromatic hydrocarbons (PAH), Mitigation Measures Assessment</td></tr>
<tr><td>GB10905702728 0</td><td>Rhymney R - conf Nant Cylla to Chapel Wood</td><td>Brominated diphenylether (BDPE), Polyaromatic hydrocarbons, Heptachlor, and heptachlor epoxide</td></tr>
<tr><td>GB30947042</td><td>Cardiff Bay</td><td>Mitigation Measures Assessment</td></tr>
<tr><td>GB70910006</td><td>Whitchurch Canal</td><td>Mitigation Measures Assessment</td></tr>
<tr><td>GB53090541540 1</td><td>SEVERN LOWER</td><td>Mercury, Angiosperm (saltmarsh), Invertebrates (Infaunal Quality Index), Mitigation Measures Assessment</td></tr>
</table>
The incorrect groundwater waterbodies have been included – suggest this section is updated and focuses on the Cardiff scale, rather than the national scale.
The main groundwater WB under Cardiff Unitary Authority is GB40902G201500 SE Valleys Southern Devonian Old Red Sandstone & Triassic Mercia Mudstone. Smaller part of the area covered by GB40901G203600 SE Valleys Carboniferous Limestone and then just a small part at the north is GB40902G201900 SE Valleys Carboniferous Coal Measures
The poor status is driven by ‘Chemical Dependent Surface Water Body Status’ – which relates to the potential for historic coal mining activities to impact upon surface waters.
<table>
<tr><th>WB</th><th>2021 Quantity Status</th><th>2021 Chemical Status</th></tr>
<tr><td>GB40902G201500 SE Valleys Southern Devonian Old Red Sandstone & Triassic Mercia Mudstone</td><td>Good</td><td>Good</td></tr>
<tr><td>GB40901G203600 SE Valleys Carboniferous Limestone</td><td>Good</td><td>Good</td></tr>
<tr><td>GB40902G201900 SE Valleys Carboniferous Coal Measures</td><td>Good</td><td>Poor</td></tr>
</table>
</td><td></td></tr>
<tr><td>Groundwater monitoring</td><td>When the barrage was constructed in the late 1990s for Cardiff Bay there were concerns that this could cause groundwater flooding to below ground structures in the Grangetown area of Cardiff and monitoring boreholes were installed to monitor this – the data from these boreholes should be considered as historical groundwater level data and could be used to see if this has occurred. NRW don’t have any groundwater level monitoring site within the Cardiff area, we do have a network of groundwater monitoring site around Wales, but none in this area, therefore it may be more relevant to only include information relevant to the CC area.</td><td>Comments relating to groundwater have been addressed in Section 1.5.5 Groundwater of Appendix B Baseline.</td></tr>
<tr><td>4.6 Air Quality</td><td>Any flood alleviation plans that could impact traffic routes would need to consult Cardiff’s Air Quality Management Plans to ensure that changes in traffic flows do not increase air quality issues. The report could acknowledge the current trend in electric vehicles which should also contribute to reduced NOx emissions in the communities.

It is also important to note that there is emerging legislative controls being introduced by Welsh Government via The Environment (Air Quality and Soundscapes) Bill that will introduce new air quality targets within Wales.</td><td>Comments relating to air quality have been addressed in Section 1.6.1 of Appendix B Baseline.</td></tr>
<tr><td>4.7 Climatic Factors</td><td>• Please refer to Met Office data for Cardiff SPF City Pack_editable_template (metoffice.gov.uk)

• Include risk of landslides and coal tips, refer to Public Health Wales’s Climate Change Health Impact Assessment.

• Include risk of wildfires, refer to Public Health Wales’s Climate Change Health Impact Assessment.

• Include that although overall precipitation levels are expected to decrease over the summer months, there will still be high intensity rainfall events, and consider interactions with other climate change risks (e.g., drought, wildfire)

• Include details of the Shoreline Management Plan and Coastal erosion within CC

• Include details of the numbers of people/properties at risk of flooding considering climate change, as well as the expected rainfall figures</td><td>Comments relating to climatic factors have been addressed in full.

Risk of landslides, coal tips, and wildfires are included in Section 1.7.3 of Appendix B Baseline.

Future climate change including precipitation, population impacted by flooding, and temperature is included in Section 1.7.3 of Appendix B Baseline.</td></tr>
<tr><td>4.8 Flooding</td><td>Suggestion to include:

Previous incidents of flooding

As part of the scoping and the collation of baseline information, some mention of historical flooding within the region would aid the assessment and valuable evidence.

Flooding from reservoirs</td><td>Flooding from groundwater is included in Section 1.8.3 of Appendix B Baseline. Flooding from reservoirs is included in Section 1.8.5 of Appendix B Baseline.

Shoreline management plans and the National Caoastal Erosion Risk Management map are referenced in Section 1.8.6 of Appendix B Baseline.</td></tr>
</table>

Point	Comment	Response to Consultee Comment
	Consider a section specific to reservoirs, e.g., "**4.8.x Flooding from reservoirs** Flooding from reservoirs caused by the failure of a dam or other water retaining structure is possible within Cardiff area. Reservoir flooding is generally considered to be a low likelihood high hazard risk. Reservoir owners are liable for the safety of the structures. Flood maps indicating the flood extent which may occur if a reservoir fails is available on NRW's flood map viewer. Cardiff Council is responsible for maintaining offsite reservoir flood plans for responding to reservoir flood incidents." In summary, reservoir dam failure could severely impact on the majority of the themes set out in Table 2. The SEA should set clear Objectives, Measures and Actions for how reservoir flood risk is managed within CCC as a reservoir owner to reduce its own flood risk and as LLFA for emergency planning purposes. **Flooding from groundwater** Consideration is needed for groundwater flooding due to groundwater rebound as large historical abstractions cease pumping and groundwater levels return to pre-abstraction levels. This will cause flooding of underground structures that may have been built in the intervening time (for examples, basements) - these will be vulnerable to flooding. Existing flood risk assets within Cardiff Should include information on existing flood risk assets within CC, particularly as resilience of flood defense infrastructure is included in Environmental Objective 8. **Shoreline Management Plan** Reference should be made to the Shoreline Management Plan and associated policy units and actions. **Coastal Erosion** Reference should be made to coastal erosion, please refer to the National Coastal Erosion Risk Management map"	
4.8.2 Flood Zones	The Flood Map for Planning (FMfP) indicates the potential extent of flooding assuming no defenses are in place. It also takes account the effects of climate change over a 100yr lifetime of development. Flood Zone 3 itself can also be viewed to show the individual risk i.e., flood zone 3 – rivers, flood zone 3 – sea, as well as a combined risk of rivers and the sea. The same goes for flood zone 2. The FMfP represents the best available information on flood risk but does not yet have official status until Welsh Government publish a revised TAN15, we do however use it to inform our planning advice since it is best available information. The DAM map is not NRWs, it is hosted on behalf of the Welsh Government. This underpins the current TAN15 (2014) and for now, remains the screening tool for planning purposes. The description "These zones describe the characteristics of the floodplain including whether they benefit from flood defence infrastructure" is not quite accurate as only C1 shows areas where there may be flood defences. It might be better to simply state "Each of these development advice zones attribute different planning actions set out in TAN15 (2004). These actions aim to avoid inappropriate development in areas at risk of flooding." We suggest that it is clearer that the FMfP does differ to the DAM and include on Figure 17 label, whether that is FMfP or DAM. Also suggest Surface Water and Small Watercourses is also included, given the relevance to the LFRMS.	The status of the FMfP is referenced in Section 1.8.2 of Appendix B Baseline. The DAM map is correctly referenced as hosted by the Welsh Government and has been added to the title of Figure 13 within Appendix B Baseline for clarity. DAM reference and context has been updated to reflect the suggestion. Surface Water and Small Watercourse Flood Risk are included in Section 1.8.4 of Appendix B Baseline.
4.8.4	Typo - Dŵr Cymru Welsh Water	Typo has been updated across documents.
U4.9 Material Assets	The Climate Change Risk Assessment 3 (CCRA3) summary for Wales identified the following risks, relevant to flood risk, which have a high future magnitude score and where more action is required to address them: • Increased severity and frequency of flooding on homes, communities, and businesses. • The impact of coastal businesses due to sea level rise, coastal flooding, and erosion. • More frequent flooding and coastal erosion causing damage to our infrastructure services, including energy, transport, water and Information and Communication Technologies (ICT) Further consideration is needed for baseline and climate change flood risk impacts on key infrastructure, including emergency services, energy, transport, water (water supply, treatment works, pumping stations, sewerage treatment works) and ICT.	CCRA3 risks have been included in Section 1.9.6 Material Assets within Appendix B Baseline.
4.9.2	Suggestion to compare with flood risk information to see how many dwellings are at risk, including social housing, as there would be impacts on other CC services, e.g., if a significant number of people needed to be re-homed following a flood.	Number of properties at risk from flooding is included in Section 1.9.2 of Appendix B Baseline. There is no distinction in the PSB which are social/affordable housing.
4.9.3	Suggestion to include insurance within the economy section, and further detail about the businesses within CC and how they may be at risk of flooding or coastal erosion.	Insurance is not an environmental consideration.
4.9.5	This should refer to Cardiff's Transport White Paper: Transport Vision to 2030, Cardiff Bus Priority Plan 2024 –2030 and Transport for Wales' Climate adaptation and resilience plan (tfw.wales) for baseline evidence, issues and opportunities Active travel, public rights of way, access routes and associated structures should be considered	Reference to indicated plans is made in Section 1.9.5 of Appendix B Baseline.
4.10 Cultural heritage	Suggest comparison of listed buildings/conservation areas/SAMs with areas at risk of flooding and coastal erosion.	The SEA has considered cultural heritage assets and areas and their relationship with flooding and costal erosion. The assessment of measures and actions has considered as part of SEA Objective 6.
5. Scoping	Suggest that transport is scoped into the SEA as flooding will offer challenges and opportunities to transport in the present day and considering climate change, please see more detailed comments in 4.9.	The SEA has considered the impact of increased flooding on infrastructure, including transport infrastructure based on present day and considering climate change where relevant.

Point	Comment	Response to Consultee Comment
5.2 Table 8 Proposed scope of SEA	Biodiversity – welcome reference to contributing towards biodiversity net gain in line with the GIA and Resilient Ecological Networks (Nature Networks) This has been added Cultural heritage – suggest 'main rivers' is replaced with flood risk areas, given context of the LFRMS This has been added Population and human health – welcome reference to green infrastructure through the human health lens This has been added Population and human health – would challenge this point listed as an opportunity "There is an opportunity to improve flood prevention and mitigation which could indirectly release land for new housing, employment land, community facilities and infrastructure to support the growing and aging population" and the associated question in Table 10 (Would the Plan help release land available for development (as a result of reduced flood risk)?) In the National Strategy for Flood and Coastal Erosion Risk Management in Wales, it states: • "254. FCERM schemes should not be considered in defending land for the development of new homes (see paragraphs 220- 221), reinforcing our policies to discourage inappropriate development in higher risk areas." • "325. FCERM funding is not available to enable new development and schemes reducing the risk solely to new homes or businesses will not be prioritised." Also given that the 2021 draft version of TAN15 states; "13.6 New flood defence infrastructure is only intended to protect existing places and communities that are already at risk of flooding. Constructing new defence infrastructure to enable new development is not acceptable as it removes valuable flood storage areas and places more households and businesses at risk of flooding. New development may, in principle, be located in areas where existing flood defence infrastructure has been strengthened to the extent that it becomes a TAN 15 Defended Zone (see Figure 2). Land use and landscape- It is important to look at green infrastructure at a landscape scale and how it fits with the nature networks (not only in terms of spatially, but using the right species in the right place). This has been added Air quality – Sustainable Drainage Solutions and green infrastructure also link to improvements to air quality, so any nature based solutions may have benefits and should be noted.This has been added.	The Potential Environmental Effects of the draft Plan have been updated within Table 3 of the SEA Environmental Report.
6.2 Table 10	• Would suggest Flooding is relevant to all objectives, as per earlier comment that it should be considered within each topic, as well as an introduction to the specific risks within CC • Objective 2 - Climate and Carbon and Land use and landscape also relevant, it also links with Objective 12 • Objective 7 could be widened to water quality, rather than just groundwater given the LFRMS objective and has links with Objective 17 • Objective 10 could also include Climate and Carbon, to acknowledge the opportunity of soil carbon stores • Objective 11 – would be more appropriate to include 'Would the Plan contribute to the sustainable management of land in CC care, rather than Welsh Government Woodland Estate which is managed by NRW	Objectives 7, 10 and 11 have been updated in SEA Environmental Report

Comments on the Appendix A: Plans, Programmes and Policies appendix	• NRW provided comments on Appendix A – Plans, Programmes and Environmental Protection Objectives. These included updates or inclusion of the following polcies
	  • British Red Cross
	  • Planning (Listed Buildings and Conservation Areas)
	  • The Historic Environment (Wales) Act
	  • Water Act 2014
	  • Natural Resources Wales Flood Risk Management Plan: National Overview
	  • Civil Contingencies Act 2004
	  • Socio Economic Duty
	  • Public Health Wales Health Impact Assessment on Climate Change
	  • LANDMAP, Landscape and a Changing Climate
	  • Historic Environment and Climate Change Sector Adaptation Plan (February 2020)
	  • Tranquillity and Place mapping
	  • Dark Skies and Light Pollution in Wales
	  • Transport for Wales, Climate adaptation and resilience plan
	  • Dwr Cymru Reports
	  • Cardiff Transport Strategy (2017)
	  • Cardiff's Transport White paper: Transport Vision to 2030
	  • UK Climate Risk Independent Assessment (CCRA3)
	  • River Basin Management Plan Overview Wales
	  • South Central Ecosystem Profiles: Freshwater
	  • South Central Wales Forest Resource Plans (NRW)
	  • NRW Flood Risk Management Plan 2 (FRMP 2)
	  • Taff and Ely Opportunity Catchment
	  • South East Valleys Abstraction Licensing Strategy (November 2017)
	  • Coal Tip Safety
	  • Cardiff Councils Corporate Plan 'Delivering a Stronger, Fairer, greener Cardiff
	  • Cardiff Councils Clean Air Report
	  • Cardiff Council Shoreline Management Plan
	  • Technical Advice Note15 (TAN15): development, flooding and coastal erosion
		All policies identified within the SEA have been taken account of and updated within the report with the exception of the report *Flood vulnerability, risk and disadvantage: A report by Sayers and Partners for the Joseph Rowntree Foundation June 2017*, and *Climate Adaptation Risk Recommendations- Cardiff Capital Region* which could not be located from public sources.

Table 2 Cadw comments on the Draft SEA Scoping Report

Point	Comment	Response to Consultee Comment
Section 4.10.7	• Historic Battlefields of the scoping document states there are no known battlefield within the plan area. This is incorrect. There are no registered battlefields in the area as there are none in Wales, however, there is an inventory of Battlefields in Wales 1and this identifies a number of battlefields in the area, most notably the Battle of St. Fagans.	This is noted in Section 1.10.8 of Appendix B Baseline.
	• It should also be noted that there are non-designated historic assets in the area that could be of National importance. Heneb, The Trust for Welsh Archaeology, curate the statutory Historic Environment Record on behalf of the Welsh Ministers, should be consulted on the Cardiff Flood Risk Strategy.	The Draft LFRMS and Action Plan will be circulated with Heneb, The Trust for Welsh Archaeology at its next round of consultation.
Appendix A	• The Ancient Monuments and Archaeological Areas Act 1979; The Historic Environment (Wales) Act 2016 and The Planning (Listed Building and Conservation Areas) Act 1990. These Acts will be replaced by The Historic Environment (Wales) Act 2023 which will be enacted before the EIA is produced. The enactment of the Act will also lead to revisions to Technical Advice Note 24: The Historic Environment 2017 and other guidance notes. The Act is a Consolidation Act and should not alter legislation, but references to the various parts of the Acts that have been consolidated will need to be changed to refer to the 2023 Act.	This distinction has been updated in Appendix A - Plans, Programmes and Environmental Protection Objectives within Table A.1.2 and all affected documents reference The Historic Environment (Wales) 2023 Act.

[1] The Inventory of Historic Battlefields in Wales

Water Framework Directive (WFD)

ARUP

Cardiff Council

Cardiff Local Flood Risk Management Strategy

Water Framework Directive Screening Assessment

Reference:

P01 | 3 October 2024

Job number 300629-00

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ARUP

Document Verification

Project title	Cardiff Local Flood Risk Management Strategy
Document title	Water Framework Directive Screening Assessment
Job number	300629-00
Document ref	
File reference	

Revision	**Date**	**Filename**	Cardiff LFRMS WFD Assessment		
P01	03/10/2024	**Description**	WFD Assessment to support the SEA and HRA for the LFRMS		
			Prepared by	**Checked by**	**Approved by**
		Name	Lucy Rushmer	Rhodri Thomas	Robin Campbell
		Signature			
		Filename			
		Description			
			Prepared by	**Checked by**	**Approved by**
		Name			
		Signature			
		Filename			
		Description			
			Prepared by	**Checked by**	**Approved by**
		Name			
		Signature			

Issue Document Verification with Document ☐

Contents

Figures

Figures

Executive Summary

Cardiff Council (CC) commissioned Ove Arup and Partners Ltd. (Arup) to prepare a Preliminary Water Environment Regulations (WER) assessment (also known as Water Framework Directive (WFD) assessment) to inform the CC-authored Cardiff Local Flood Risk Management Strategy (LFRMS). CC is working in partnership with Natural Resources Wales (NRW) to deliver the long-term flood risk management strategy ('the Strategy').

This baseline WFD assessment has identified 11 surface (river) water bodies (including 1 canal and 1 lake), 1 transitional and 2 groundwater bodies within the Cardiff LRFMS area. Only 2 of these water bodies are currently at Good status. Many are failing due to physical modification, barriers to fish migration, impoundment, atmospheric deposition, contaminated bed sediments, sewage discharge, incidents, land drainage and urban development.

Comments received from NRW during their consultation on the draft SEA have been incorporated into this assessment. The actions proposed in the LFRMS have been screened against the objectives of the Water Environment Regulations. Many have been screened out as they will not impact on the WFD Status of water bodies in the CC administrative area.

The following actions have been screened in:

- CDFA2 - Develop and adopt a surface water management policy in line with Technical Advice Note (TAN) 15 guidance
- CDFA13 - Update Cardiff Council Culverting policy
- CDFA16 - Assist in the development and maintenance of Cardiff Council Green Infrastructure Plan
- CDFA17 - Review adopted Flood Risk strategy and associated action plans every 2 years
- CDFA18 - Assist Cardiff Council Planning Authority in the development of the SFCA and replacement LDP
- CDFA19 - Maintain Cardiff Council's Shoreline Management Plan
- CDFA20 - Ensure the adopted shoreline policy of "hold the line" is adhered to
- Rhy3, Rhy4 - Greener Rumney FBC and Construction
- Taf1 - Partake in the River Taff Catchment Masterplan alongside NRW and other RMAs
- Taf2, Taf3 - Greener Whitchurch Full Business Case / Detailed Design and Construction
- Taf4, Taf5 - Radyr Court Road BJC and Construction
- Taf6, Taf7, Taf8 - Nant Y Wedal OBC, FBC and Construction

Due to the nature of the Strategy, most of the actions screened in require future actions or project-level assessment to understand the impact upon WFD objectives.

The LFRMS has the potential to be detrimental or beneficial to implementing WFD mitigation measures. Opportunities to have a beneficial impact have been highlighted at a strategic level.

1. Introduction

1.1 Project background

Cardiff Council (CC) commissioned Ove Arup and Partners Ltd. (Arup) to prepare a Preliminary Water Environment Regulations (WER) assessment (also known as Water Framework Directive (WFD) assessment) of the action plan proposed in the CC-authored Cardiff Local Flood Risk Management Strategy (LFRMS). CC is working in partnership with Natural Resources Wales (NRW) to deliver the long-term flood risk management strategy ('the Strategy').

1.2 Purpose of this report

The purpose of this report is to:

- Identify the relevant water bodies that may be affected by the Strategy and collate the available baseline information;
- Identify relevant components of the Strategy with the potential to affect water bodies, together with any embedded mitigation measures integrated into the actions proposed by the Strategy;
- Undertake a screening assessment to where actions proposed in the Strategy have the potential to impact upon the current status and status objectives of the relevant water bodies;
- Identify any risks of non-compliance with water body objectives and associated requirements for further assessment and/or mitigation; and
- Identify potential enhancement opportunities to support the delivery of water body objectives.

This report summarises the Strategy, outlines the assessment methodology and presents the assessment results. The assessment has been undertaken in accordance with relevant guidance (see Appendix A) and has involved a desk-based study using readily available baseline information and the draft Strategy.

The assessment is a 'living document' and should be updated alongside changes to the Strategy.

1.3 Supporting environmental reports

Other relevant environmental baseline and impact assessment reports produced to date to support the optioneering for the Strategy include:

- Strategic Environment Assessment (SEA) Scoping Report; and
- Habitats Regulations Assessment (HRA) Screening Report.

These two documents have already been reviewed by NRW in August 2024.

1.4 Background to the Cardiff LFRMS

The Welsh Government's National Strategy for Flood and Coastal Erosion Risk Management (FCERM)[1] is a strategy required under the Flood and Water Management Act (FWMA) 2010[2] and sets the framework for managing flood and coastal erosion risks across Wales; every flood risk management plan in Wales must align with the overarching National FCERM Strategy objectives.

Under the FWMA, CC has been designated as the Lead Local Flood Authority (LLFA), and as such has several statutory duties. One such duty of the LLFA is to develop and adopt a Local Flood Risk Management Strategy ensuring the application and monitoring of the strategy throughout its life cycle.

[1] National Strategy for Flood and Coastal Erosion Risk Management in Wales | GOV.WALES

[2] Flood and Water Management Act 2010 (legislation.gov.uk)

Local flood risk is defined as flood risk from:

- Surface Water Runoff;
- Groundwater; and,
- Ordinary Watercourses.

The area covered by the Strategy is shown in Figure 1 and encompasses the administrative boundary of CC, which covers an area of approximately 158m^2 and contains a population of around 362,000[3]. Cardiff falls within the Ely, Taff and Rhymney main river catchments. Figure 1 shows the location of these rivers and their catchments within the boundary of Cardiff.

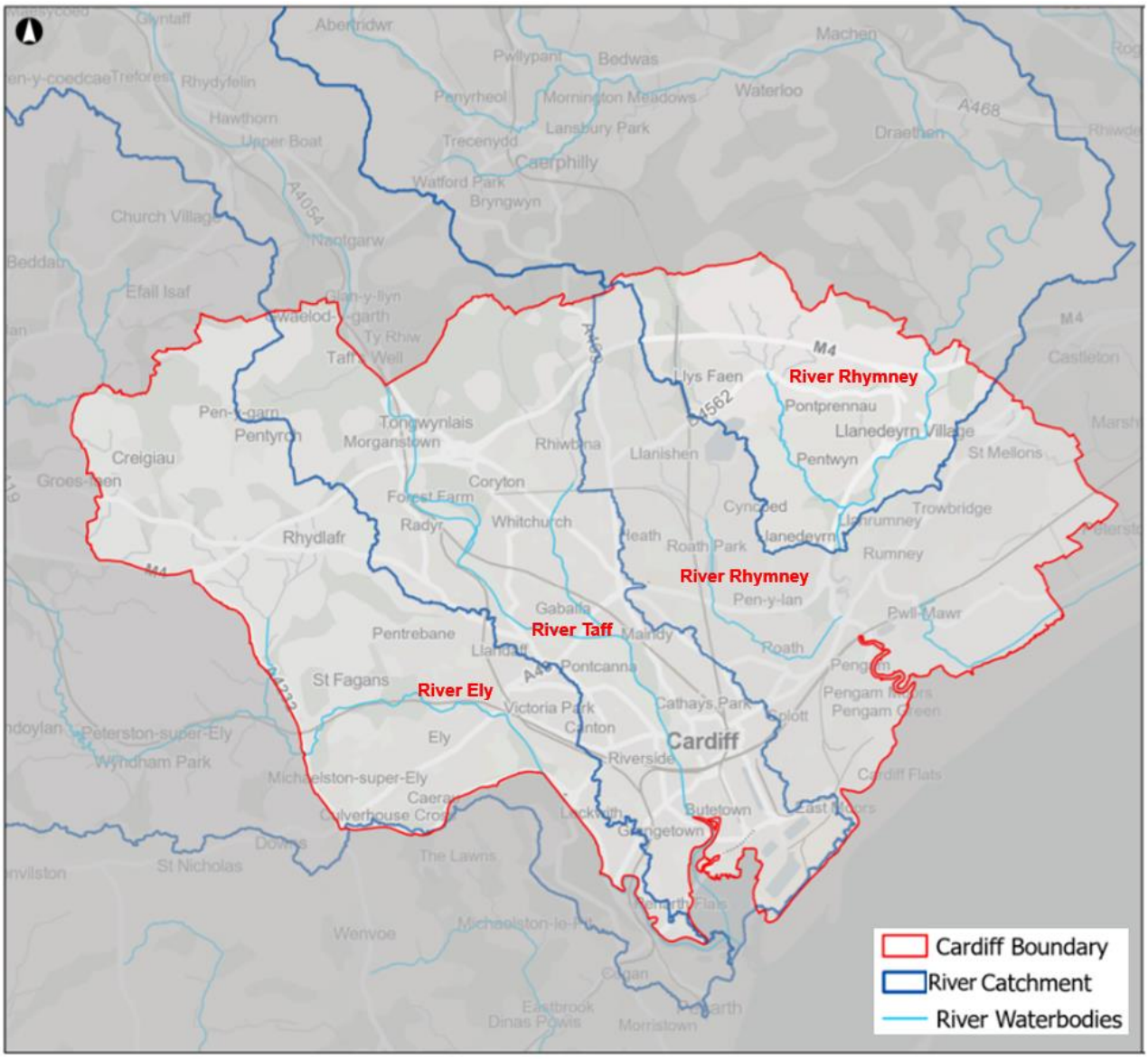

Figure 1: Cardiff WFD Catchments Overview

The Strategy identifies the strategic objectives for managing local flood risk (hereafter 'the Objectives'), the measures by which these Objectives will be met (hereafter 'the Measures') and the specific actions that will be delivered to achieve the Objectives and Measures (hereafter 'the Actions'). Full definitions for Objectives, Measures and Actions are shown in Figure 2 below.

[3] Office for National Statistics (2021) Census 2021. Available online at: https://www.ons.gov.uk/visualisations/censusareachanges/W06000015/

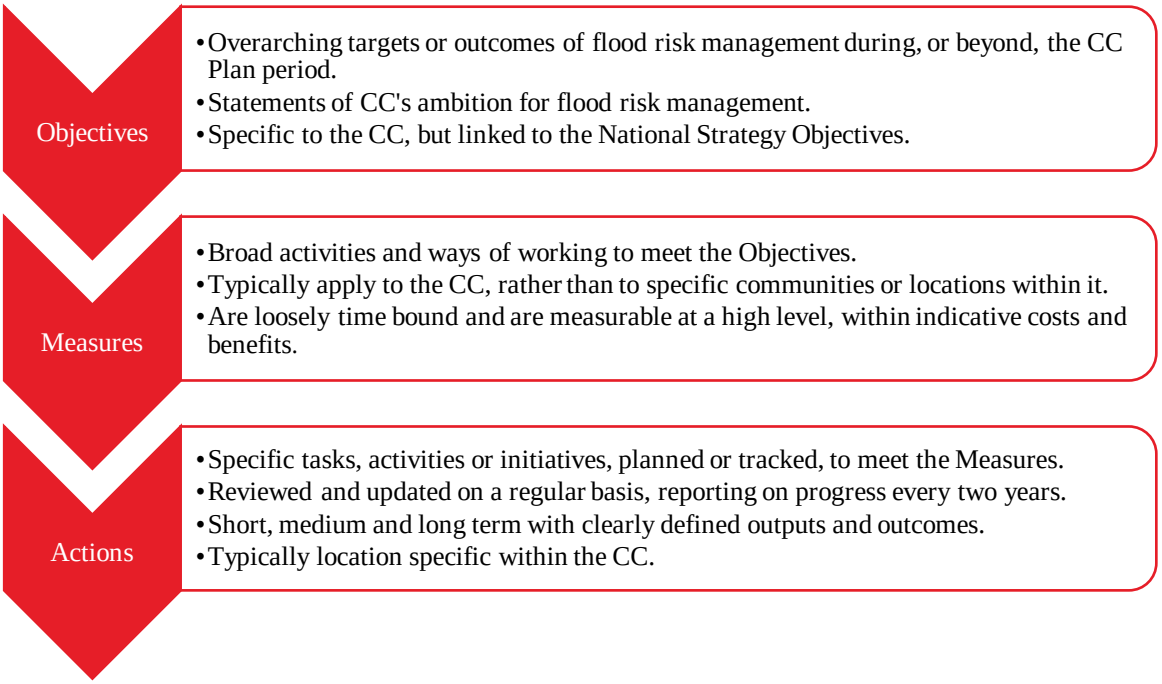

Figure 2: Definitions for Objectives, Measures and Actions

The Plan describes roles and responsibilities for the management of flood risk. In summary, strategic oversight is afforded to the Welsh Government and Natural Resources Wales (NRW). At a more local level, there are Risk Management Authorities (RMAs) who are required to fulfil statutory duties as defined in the FWMA 2010 and are responsible for the mitigation of different sources of flood risk, these RMAs are outlined in Figure 3 below.

Main River - NRW	•Flooding from watercourses designated as 'Main River' on NRW's Mapping
Ordinary Watercourse - Cardiff Council	•Flooding from all other watercourses not designated as 'Main River'
Surface Water - Cardiff Council	•Flooding caused by rainfall where the capacity of soil / drainage system is exceeded
Groundwater - Cardiff Council	•Flooding caused by water rising from underground and entering underground structures or running across the land
Highway Flooding - Cardiff Council	•Flooding caused by the inability of highway drainage system to convey surface water
Coastal Flooding - NRW	•Flooding from the sea
Reservoirs - NRW	•Flooding from reserviors

Figure 3: RMAs in Cardiff

The FWMA that was introduced in 2010, places a duty on CC to act as the Lead Local Flood Authority (LLFA) responsible for managing local flood risk resulting from ordinary watercourses, surface water and groundwater. As a result of that, CC has a number of statutory duties including:

- Developing, adapting and maintaining a strategy for local flood risk management;

- Complying with the National FCERM Strategy;
- Cooperating with RMA's and other authorities, including the sharing of data;
- Investigating flooding when it is deemed appropriate or necessary; and,
- Maintaining a register of structures that are likely affect flood risk.

Schedule 3 of FWMA 2010, that was enacted in January 2019, designated CC as the Sustainable Drainage System (SuDS) approval body. Accordingly, CC have a duty to ensure the effective management of surface water within new developments ensuring they are built in line with the mandatory National Standards for SuDs.

1.5 Why is the LFRMS needed and what will it achieve?

The FCERM National Strategy sets out that over 245,000 properties across Wales are at risk of flooding from rivers, the sea and surface water, with almost 400 properties also at risk from coastal erosion. It also explains that, as the climate changes, we can expect those risks to increase, with more frequent and severe floods, rising sea levels and faster rates of erosion of the coast.

Flooding can derive from various sources, including rivers, streams, the sea and more commonly in Cardiff from blocked drains or old sewers that cannot cope with the volumes of water from heavy rainfall. Although Cardiff has not had many significant flooding incidents, an increasing number of flooding issues occurring in periods of heavy rain have been experienced. The Objectives, Measures and Actions identified in the Plan are intended to help reduce the risk of flooding locally and minimise impacts that any flood event could have on the local communities, the environment, and the economy.

CC declared a climate emergency in March 2019, acknowledging their role and responsibility for the protection and enhancement of the environment, and committed to working towards becoming a carbon neutral organisation and city by 2030[4]. The Strategy is being developed with a view of incorporating and responding to impacts of climate change on long term flood risk.

[4] One Planet Cardiff. Our vision for a Carbon Neutral City by 2030. Available at: https://www.oneplanetcardiff.co.uk/wp-content/uploads/OPC%20vision%20document.pdf

2. Legislative Context

The Water Environment (Water Framework Directive) (England and Wales) Regulations (amended 2017) is currently the largest and most influential piece of UK legislation for the water environment and transposes the Water Framework Directive into English and Welsh law. NRW is the competent authority responsible for delivering the requirements of the WER in Wales.

The legislation takes an integrated approach to the sustainable management of water by considering the interactions between surface water, groundwater and water-dependent ecosystems.

Under the WER, 'water bodies' are the basic management units and are defined as all or part of a river system or aquifer. These water bodies form part of a larger River Basin District (RBD), for which RBMPs are developed and environmental objectives are set. These RBMPs are produced every six years, in accordance with the river basin management planning cycle.

The WER requires classification of the current condition or 'status or potential' of surface water and groundwater bodies and to set a series of objectives for maintaining or improving conditions so that water bodies reach and / or maintain 'good status or potential'. These overall Environmental Objectives are to:

- Prevent the deterioration of (and where possible enhance) the status of surface water bodies, ground water bodies and their ecosystems;
- Aim to achieve at least 'Good' status for all water bodies by 2015. Where this is not possible and subject to the criteria set out in the Directive, aim to achieve Good status by 2021 or 2027;
- Meet the requirements of Water Framework Directive Protected Areas;
- Promote sustainable use of water as a natural resource;
- Conserve habitats and species that depend directly on water;
- Progressively reduce or phase out the release of individual pollutants or groups of pollutants that present a significant threat to surface water (particularly the aquatic environment);
- Progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants; and,
- Contribute to mitigating the effects of floods and droughts.

All new (and current on-going) activities in the water environment need to be guided by the requirements of the WER. This includes ensuring that no changes occur that cause a deterioration of current status of a water body or prevents the achievement of the future status objectives of a water body. This principle is now integrated into the planning permission application process for proposed schemes.

3. Assessment methodology

This assessment will assess which WFD water bodies are impacted by the Action Plan of the Draft LFRMS. The WFD water bodies that lie in the CC administrative area are the Ely, Taff and Rhymney main river catchments (Figure 1).

3.1 Stage 1: Baseline assessment (screening)

Initial screening identified relevant WER water bodies located in the zone of influence. The zone of influence includes the physical footprint of works and the surface water bodies that run through the site and the groundwater bodies that underlies the site. Water bodies are selected for inclusion at this early stage of the compliance assessment with reference to the relevant RBMP.

This stage has considered whether the Action Plan of the Draft LFRMS has the potential to impact on WER water bodies. Where impact pathways have been considered possible, the proposed zones of influence have been established based on the proposed LFRMS Actions.

3.1.1 Water body baseline

This has been established by identifying the WER surface water and groundwater bodies potentially affected by the proposed LFRMS. Actions and identifying their baseline condition, using a desktop assessment.

The desktop assessment has collated and reviewed the water body status and status objectives information for the relevant WER water bodies based on NRW data (2022 Cycle 3 Water body Status Classification data). This data is considered to provide the current best estimate of status and the formal baseline against which the NRW will assess compliance with the 'no deterioration' objective in 2027.

The following datasets have also been used to establish the nature and existing condition of those watercourses located within WER water bodies that are affected by the Strategy:

- Severn River Basin Management Plan[5];
- Cycle 3 RBMP water body status classification and status objectives data, reasons for not achieving good (RNAG) data, protected area data;
- Historic OS maps[6];
- Ordnance Survey (OS) Open Data[7];
- DEFRA 'MAGIC' map (providing authoritative geographic information about the natural environment from across government)[8]; and,
- British Geological Society (BGS) Interactive Map[9].

[5] Environment Agency, 2022. *Severn River Basin Management Plan (Cycle 3).* Available at: https://www.gov.uk/guidance/severn-river-basin-district-river-basin-management-plan-updated-2022 (Accessed: 10/09/2024)

[6] National Library of Scotland, 2023. *Historical OS maps.* Available at: http://maps.nls.uk/os/ (Accessed: 10/09/2024)

[7] Ordnance Survey, 2023. *Open Data maps.* Available at: https://www.bing.com/mapspreview (Accessed: 10/09/2024)

[8] DEFRA, 2023. *MAGIC map*. Available at: https://magic.defra.gov.uk/magicmap.aspx (Accessed: 10/09/2024)

[9] British Geological Society, 2023. *Geology Viewer.* Available at: https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/ (Accessed: 10/09/2024)

4. Baseline assessment (screening)

A baseline assessment has been undertaken to identify the relevant WER water bodies that could be affected by the proposed LFRMS Actions. This screening assessment collates the latest available WER baseline data in order to inform the screening assessment of the likely effects of the proposed LFRMS Actions on WER status and objectives.

A summary of the draft LFRMS Plan is presented below with a number of Measures (Table 1) and Actions (Table 2).

4.1.1 LFRMS Measures

Table 1 presents the measures included under the LFRMS strategic objectives for the period 2024 – 2034.

Table 1: Summary of LFRMS Measures

Reference	Measure	Description of measure
1	Ensure Climate change projections are included in all aspects of development and flood risk management	The LLFA will ensure the impacts of climate change are included in all aspects of flood risk management and development. An uplift factor of 40% will be included in all designs, modelling and assessments of surface water drainage systems, Sustainable drainage systems and flood alleviation schemes.
2	Consultee to the planning authority and building control	The LLFA will assist the LPA in ensuring that the flood risk of existing communities is not exacerbated by new development. The LLFA will also assist the LPA in ensuring all local, regional and national flood risk policies and guidance (such as TAN 15 and the LDP) are adhered to in regard to any development.
3	SuDS Approval Body (SAB)	The enacting of Schedule 3 of FWMA 2010 by The Welsh Government on the 7th January 2019 appoints CCC as the SuDS Approval Body (SAB). Schedule 3 assigns several statutory responsibilities to CCC including the assessment and adoption of drainage designs and related enforcement powers. CC also have the ability to adopt non mandatory drainage systems which could include those only serving one property or systems approved and construction before the implementation of Schedule 3.
4	Local Flood Risk Strategy	Prepare and adopt a strategy for the management of flood risk from local sources.
5	Surface Water Strategy	CCC intends to develop a specific Surface Water Management Strategy in line with Section 8 of Tan 15.
6	Ensure Compliance with strategic policies	This strategy will ensure all decisions regarding the management of local flood risk comply with all local and national strategic policies.
7	Review and update Culverting Policy	At present CC's culverting policy only allows the culverting of a watercourse for access and amenity purposes. The updated culverting policy will make CC's position on culverting clearer and encourage the "daylighting" (removing of culverts) of watercourses.
8	Flood Risk Asset Register	Section 21 of FWMA 2010 places a statutory duty on CC to maintain a register of flood risk assets such as defences and debris screens etc.
9	Land Drainage Act 1991 duties	The LDA 1991 places statutory duties on CC as the LLFA, including permitting and enforcement powers.
10	Assist in the development of the SFCA	A strategic Flood Consequences Assessment (SFCA) is required to provide evidence to inform policies and site selection for Strategic and Local Development Plans.

Reference	Measure	Description of measure
		As sources of flood risk are not bound by authority boundaries, SFCA's are often undertaken on a regional level by the associated LPA's.
11	SuDS guidance	Develop a guidance for developers, residents and local groups to ensure effective design, management and maintenance. No current actions associated with measure 11. CC intend to include action (s) at the two-year review of the LFRMS.
12	OWC guidance	Develop a Guidance for developers and riparian owners for the management and maintenance of ordinary watercourses.
13	Response to flooding	CC response to flood events both during and after the event
14	Investigate all flooding incidents	CC will investigate all reported flood incidents impacting any flooding receptor. Should 20 or more properties suffer internal flooding from a single source then CC will undertake and write a Section 19 (FWMA 2010) report and publish on our website.
15	Flood alleviation Scheme development	There is a need for a long-term pipeline of flood alleviation schemes (FAS) to mitigate flood risk from local sources across the city. The national flood risk strategy provides guidance on how FCERM investment should be utilised and is supported by recent Business Case Guidance. This guidance utilises the use of the 5-business case model within FAS development, as adopted by The Welsh Government and HM Treasury. CC will deliver FAS from the long-term pipeline in line with the business case guidance utilising the following projects: 1. Strategic Outline Business Case (SOC) 2. Business Justification Case (BJC) or Outline Business Case (OBC) 3. Full Business Case (FBC) / Detailed Design Decisions on locations for possible FAS will be determined through a number of factors including current flood risk, CARR, climate change projections and historical flood incidents.
16	Critical Culvert Maintenance and Telemetry	CC has a number of critical culvert assets as described in Section 4.2.3. These assets have a CCTV camera and level logger that provides up to date water levels and images that inform CC response to flood events and inclement weather. Improvements to the ongoing maintenance of these assets is critical to the mitigation of flood risk whilst ensuring the longevity of the assets.
17	Internal staff training	The LLFA will provide training to CC call centre staff (C2C) and other internal departments to ensure effective advice is given to someone reporting flooding. Training will be provided to other CC departments, such as Waste Management, to ensure all CC resources are utilised, as far as is reasonably practicable, in any response to flooding, as per Measure 13.
18	Consultee to CC Resilience Management Unit	CC Resilience Unit has a statutory duty under the Civil Contingencies Act 2004 to adopt and maintain plans to respond to flooding emergencies. The LLFA will assist the Resilience Unit in the update of these plans and work with them during a major flooding event. Effective response plans will involve the community throughout the process, ensuring community engagement pre, during and post flood event.
19	Sharing of Surface water modelling	The LLFA will share any surface water modelling undertaken as part of FAS as described in measure 15.

Reference	Measure	Description of measure
		The resultant modelling will be shared with The Welsh Government and NRW to inform the latest round of flood risk mapping, as described in section 5.
20	Engagement with local communities before, during and after flood events	CC will engage with communities before during and after a flood event, ensuring that communities have increased resilience to flooding. CC will engage with communities advising them of their current flood risk and encouraging the installation of flood mitigation measures such as property level flood protection (PFR). CC will work with any communities that wish to install PFR to ensure effective measures are put in place. Post flooding event, CC will, as far as is reasonably practicable, assist communities in their response to flooding events, for example, by offering disposal of damaged items, providing any other assistance where practicable, such as LLFA flooding statements for insurance claims.
21	Assist communities with the creation and operation of community flood groups	CC cannot remove all flood risk, but local communities that are well prepared for flooding can increase their resilience dramatically. CC will work with communities to develop their own flood risk group and management plan. Local communities will know their area well and CC will work with them to develop flood plans for before, during and after a flood event. CC will have actions within the plan, such as collecting leaf litter or assisting in recovery. We will also assist the communities in updating their plan as and when required.
22	Collaborate with other RMA's and organisations to lower flood risk	All RMA's such as DCWW and NRW have a requirement under relevant legislation to adopt their own Flood Risk strategies. CC will collaborate with these RMA's to lower flood risk across Cardiff from all relevant sources. CC currently meet with DCWW on a monthly basis to discuss flooding incidents and FAS that are relevant for both organisations and will work to include further RMA's in the discussions. CC shares a border with Caerphilly County Borough Council, Newport City Council, Rhondda Cynon Taf Council and The Vale of Glamorgan Council. CC will liaise directly with these authorities, acting as the LLFA, to discuss cross border flooding incidents and schemes, whilst also working together with them to lower flood risk to communities on the authority borders.
23	Collaborate with NRW and DCWW regarding pollution incidents	Incidents of pollution are present throughout Cardiff contributing to the poor WFD status of watercourses across Cardiff. CC liaise directly and meet regularly with NRW and DCWW to discuss instances of pollution across the city from residential and commercial properties and also from both consented and unconsented CSO's. Should the pollution be because of a misconnection, DCWW and NRW investigate the misconnection, however, the enforcement powers lie with CC under The Building Act 1984. If the pollution has entered an ordinary watercourse from uncontrolled surface water runoff, from a development site for example, CC will collaborate with NRW to investigate and utilise its enforcement powers under The LDA 1991 if required.
24	School Flooding and Water safety talks	CC Flood Risk Management Team undertake flooding and water safety talks in primary and secondary schools. Flooding talks: Presentation showing all aspects of flooding including resilience and recovery. The impacts of climate change are a key aspect of the talk, ensuring it complies with the new curriculum. Water Safety Talks: CC have worked with Atlantic Crest, a specialist water safety company to develop water safety presentations aimed at the relevant age groups.

Reference	Measure	Description of measure
		The talk includes what to do during an emergency involving water, what to do during a flood and also key life skills such as speaking to the emergency services and international lifeguard signals.
25	Collaboration with Academia	There is an emerging issue within the flood risk industry regarding the availability of resource and engineers to allow the industry to grow. The introduction of Schedule 3 of FWMA 2010 has emphasised the need for graduates to enter the flood risk industry and RMA's have a key role to play in this. CC have developed important relationships with The University of Bath, Cardiff University and the University of South Wales, which has resulted in collaboration on a number of levels. This ranges from students undertaking work-based learning placements and dissertations to collaborating with university professors on published journal articles.
26	Riparian Owners	As described in 4.3.7, riparian owners have a number of duties and responsibilities for ordinary watercourses that flow through their land. Along with the guidance described in measure 12, CC will work with riparian owners to ensure effective management and maintenance of ordinary watercourse throughout the city.

4.1.2 LFRMS Actions

Table 2 summaries the actions included under the LFRMS strategic objectives for the period 2024 – 2034.

4.1.3 Screening Assessment

This baseline/initial screening stage has considered whether the proposed LFRMS Actions have the potential to impact on relevant WER water bodies. Table 2 identifies the proposed LFRMS Actions that will (screened in) and will not impact on the relevant WER water bodies (screened out). A justification for actions screened in and out is provided (Table 2).

It should be noted that a project specific WFD assessment needs to be completed for separate schemes which are a result of the proposed LFRMS Actions.

Where impact pathways have been considered possible, the proposed zones of influence have been established based on the proposed LFRMS Actions. The zone of influence includes the physical footprint of any proposed works and the surface water bodies that run through the site and the groundwater bodies that underlie the site. Water bodies are selected for inclusion at this early stage of the compliance assessment with reference to the relevant RBMP.

Table 2: Summary of LFRMS Actions and screened in or out LFRMS Actions

Reference	LFRMS Action	Links to LFRMS Measures	Screened In/Out	Justification
CDFA1	Improve and maintain CCs Flood Risk Page. Advising on mitigation, action and recovery measures pre, during and post flood	13,14,17,20,21	Out	Website based, no works.
CDFA2	Develop and adopt a surface water management policy in line with Tan 15 guidance	1,2,3,4,5,6	In	TAN15 guidance is to adopt a risk-based approach in relation to flood risk management, therefore adoption of any surface water management policy in line with TAN15 has the potential to impact on the WFD status of water bodies. Future action required. New policy to be reviewed against Severn RBMP objectives as the policy is being developed.
CDFA3	Maintain and update flood risk asset database as required under Section 21 of The Flood and Water Management Act 2010	8	Out	Asset management, no works.
CDFA4	Supply flood risk asset data to interested stakeholders and other RMA's	19,22	Out	Data supply only.
CDFA5	Review and maintain CC flooding emergency response plan with the councils Resilience Unit	1,6,13,14,17,18,20, 21,22	Out	No impact on WFD matters.
CDFA6	Assist NRW where required in the mitigation of flood risk from Main River sources, i.e., River Ely, River Rhymney and River Taff	1,19,22	Out	NRW to lead on WFD matters for main rivers.
CDFA7	Assist local communities in developing community level local flood risk groups	19,20,21	Out	Organisational matters not related to WFD. Any physical works proposed by community groups are minor and volunteer-led, and very unlikely to have detrimental impact. WFD assessment requirements should be screened as part of consent applications.
CDFA8	Provide education facilities with presentations and resources around flooding and climate change to feed into the new curriculum	1,17,20,21,22,24,25	Out	Community based, no works.

Reference	LFRMS Action	Links to LFRMS Measures	Screened In/Out	Justification
CDFA9	Work with Dŵr Cymru Welsh Water for the removal of surface water from public sewerage systems through surface water removal schemes and SAB approvals	3,9,19,22,23	Out	To be considered on project level basis where works are proposed. Potential for beneficial effect upon water quality leading to a positive impact on WFD.
CDFA10	Ensure any best practice is incorporated into any Section 19 flood investigation reports	13,14	Out	Investigation only, no works.
CDFA11	Maintain CC telemetry to capture real time rainfall and water level information	14,16	Out	Data capture only, no works.
CDFA12	Enhance and maintain a long term Capital flood alleviation scheme pipeline adhering to Welsh Governments Business Case Guidance	15,22	Out	WFD to be considered on project-by-project basis.
CDFA13	Update CC Culverting policy	6,7,9,16,26	In	Update to CC's existing culvert policy (2014) which is currently opposed to the culverting of watercourses, considering it beneficial for watercourses to remain in an open state for both flood risk management and environmental purposes. Wherever practical CC will seek to have a culverted watercourses restored to open channels. Update has potential to impact on WFD status of water bodies. Consult with NRW technical specialists during update to inform the most environmentally beneficial outcome.
CDFA14	Update CC Sandbag policy	6	Out	Update to CC's existing sandbag policy (2014) is regarding the provision of sandbags and therefore is unlikely to impact the water environment.
CDFA15	Develop and maintain Ordinary watercourse guidance	6,12,26	Out	The development of guidance documents will not lead to development or any other change. It is understood that this action will assist users in navigating requirements. Opportunity to make applicants aware of WFD objectives and requirements.
CDFA16	Assist in the development and maintenance of CC Green Infrastructure Plan	2	In	Need to consider WFD as specific actions are developed in the GIP.

Reference	LFRMS Action	Links to LFRMS Measures	Screened In/Out	Justification
CDFA17	Review adopted Flood Risk strategy and associated action plans every 2 years	4,6	In	High level consideration of local flood risk management strategy against WFD objectives.
CDFA18	Assist CC Planning Authority in the development of the SFCA and replacement LDP	2,5,6,10	In	SFCA to consider WFD compliance against identified actions and policy.
CDFA19	Maintain CCs Shoreline Management Plan	4,6	In	WFD assessments to be undertaken where triggered (e.g. to support Marine Licence applications).
CDFA20	Ensure the adopted shoreline policy of "hold the line" is adhered to	4,6	In	The Severn Estuary SMP considers WFD at a plan-level. For Cardiff, the SMP WFD assessment states: *In the mid to long term, foreshore erosion rates would increase due to sea level rise and would require continued maintenance of the defences. There are not considered to be any large scale measures that could be undertaken in this Management Area and it is not considered that there would be a deterioration in status, through the SMP policy, however, in the mid to long term sea level rise will occur potentially resulting in the loss of intertidal habitats such as saltmarsh (Angiosperms), therefore failing Environmental Objective WFD2. However localised opportunities should be sought to improve ecological potential.*
CDFA21	Develop flood risk policy / process / understanding with neighbouring RMA's	20,22	Out	Policy development only.
Ely1	Working with residents at Wroughton Place to develop a local flood risk group	20,21	Out	No works proposed. Community preparedness only.
Ely2	Working with St Fagans Community Council to develop a local flood risk group	20,21	Out	No works proposed. Community preparedness only.
Rhy1	Construction of Coastal Defences on Rhymney Estuary	1,15	Out	Project specific WFD assessment completed already.
Rhy2	Climate Change and Flood Risk School Talks	1,20,21,22	Out	Talks to schools, no works.
Rhy3	Greener Rumney FBC	1,15,19	In	Project specific WFD assessment to be completed.

Reference	LFRMS Action	Links to LFRMS Measures	Screened In/Out	Justification
Rhy4	Greener Rumney Construction	1,15,19	In	Project specific WFD assessment to be completed.
Taf1	Partake in the River Taff Catchment Masterplan alongside NRW and other RMA's	1,20,21,22	In	Project led by NRW. CC is a stakeholder. WFD assessment to be completed for project and led by NRW.
Taf2	Greener Whitchurch Full Business Case / Detailed Design	1,15,19	In	Project specific WFD assessment to be completed.
Taf3	Greener Whitchurch Construction	1,15,19	In	Project specific WFD assessment to be completed.
Taf4	Radyr Court Road BJC	1,15,19	In	Project specific WFD assessment to be completed if necessary.
Taf5	Radyr Court Road Construction	1,15	In	Project specific WFD assessment to be completed.
Taf6	Nant Y Wedal OBC	1,15,19	In	Project specific WFD assessment to be completed.
Taf7	Nant Y Wedal FBC	1,15,19	In	Project specific WFD assessment to be completed.
Taf8	Nant Y Wedal Construction	1,15	In	Project specific WFD assessment to be completed.
FLH1	Undertake a T98 Asset survey for whole coastline as required by shoreline management plan	8,22	Out	The T98 asset survey is a non-intrusive visual survey of the coastline as required by the SMP, which has been assessed by a separate plan level HRA. There is potential for the survey to identify works required to maintain the coastline, which could have implications for Severn Estuary European sites, however this would be considered following the results of the survey.
Notes:	No actions associated with measure 11. CC intend to include action (s) relating to this measure at the two-year review of the LFRMS.			

Table 3 summarises which WFD water bodies are in the CC's administrative area which may be impacted by the LFRMS Actions that have been screened in to the WFD Screening Assessment. The LFRMS Actions are located within the Severn River Basin District (RBD). The Figures appended to this screening assessment show the location of the water bodies relative to the CC boundary.

Table 3: Status of WFD water bodies impacted by the LFRMS Actions that are screened in

Water body ID	Water body name	Operational Catchment	Water body type	Water body designation	Overall Water body Status
GB109057027080	Nant Dowlais - source to conf Ely R	Ely	River	Natural	Poor
GB109057027100	Nant Clun - source to conf Ely R	Ely	River	Natural	Poor
GB109057027260	Ely R - conf Nant Clun to Allot Gardens, Ely	Ely	River	Natural	Poor
GB109057027220	Whitchurch Bk - source to conf R Taff	Taff US Cynon	River	Heavily Modified	Moderate
GB109057027270	Taff - conf Rhondda R to Castle Street	Taff US Cynon	River	Heavily Modified	Moderate
GB109057027150	Roath Brook	Rhymney	River	Heavily Modified	Moderate
GB109057027160	Nant Glandulas - source to conf Rhymney R	Rhymney	River	Heavily Modified	Poor
GB109057027280	Rhymney R - conf Nant Cylla to Chapel Wood	Rhymney	River	Natural	Moderate
GB109056026770	Rhosog Fach Reen - source to Severn Estuary	Reens West	River	Artificial	Moderate
GB30947042	Cardiff Bay	Not applicable	Lake	Heavily Modified	Moderate
GB70910006	Whitchurch Canal nr Cardiff	Not applicable	Canal	Artificial	Moderate
GB530905415401	Severn Lower	Severn Lower	Transitional	Heavily Modified	Moderate
GB40902G201500	SE Valleys Southern Devonian Old Red Sandstone & Triassic Mercia Mudstone	SE Valleys Southern Devonian Old Red Sandstone and Triassic Mercia Mudstone	Groundwater	Natural	Good
GB40901G203600	SE Valleys Carboniferous Limestone	SE Valleys Carboniferous Limestone	Groundwater	Natural	Good

Table 4 shows which WFD water bodies that may be impacted by the LFRMS Actions that are not Achieving 'Good' overall WFD status and the reasons for them failing to reach 'Good' status.

Table 4: Reasons why water bodies are failing WFD status

Water body ID	Water body name	RNAG Class Element	Failing biological element	SWMI	Activity causing failure	Business Category
GB109057027080	Nant Dowlais - source to conf Ely R	Phosphate	N/A	Point source	Sewage discharge (continuous)	Water Industry
GB109057027100	Nant Clun - source to conf Ely R	Fish Invertebrates	Other (not in list) Organic pollution	Diffuse source Point source	Sewage discharge (continuous) Sewage discharge (diffuse) Incidents	Urban and Transport Unknown (pending investigation) Water Industry
GB109057027260	Ely R - conf Nant Clun to Allot Gardens, Ely	Fluoranthene Fish Invertebrates Phosphate Polyaromatic hydrocarbons (PAH)	Morphology Organic pollution	Diffuse source Point source Physical modification	Atmospheric deposition Contaminated water body bed sediments Sewage discharge (continuous) Barriers to fish migration Incidents Sewage discharge (continuous) Sewage discharge (intermittent)	Other (not in list) Urban and Transport Water Industry Unknown (pending investigation)
GB109057027220	Whitchurch Bk - source to conf R Taff	Phosphate Fish	Morphology Organic pollution	Diffuse source Point source Physical modification	Sewage discharge (diffuse) Unknown (pending investigation) Sewage discharge (continuous) Sewage discharge (intermittent) Barriers to fish migration Urbanisation - urban development	Urban and Transport Agriculture and rural land management Domestic/ General public Water Industry
GB109057027270	Taff - conf Rhondda R to Castle Street	Fish	Morphology	Physical modification Diffuse source Point source	Barriers to fish migration Atmospheric deposition Contaminated water body bed sediments Sewage discharge (continuous)	Unknown (pending investigation) Other (not in list) Urban and Transport Water Industry

Water body ID	Water body name	RNAG Class Element	Failing biological element	SWMI	Activity causing failure	Business Category
GB109057027150	Roath Brook	Hydrological Regime Invertebrates Macrophytes and Phytobenthos Combined Phosphate	Organic pollution	Flow Physical modification Point source Diffuse source Other pressures	Impoundment - water storage Impoundment - no water storage Urbanisation - urban development Industrial/ trade discharge (non EPR) Sewage discharge (diffuse) Sewage discharge (intermittent) Internal nutrient load (lakes only) Industrial/trade discharge (non EPR)	Water Industry Urban and Transport Industry, Manufacturing and other Business
GB109057027160	Nant Glandulas - source to conf Rhymney R	Fish Hydrological Regime Macrophytes and Phytobenthos Combined	Morphology Other Nutrients	Physical modification Diffuse source Flow	Barriers to fish migration Urbanisation - urban development Sewage discharge (diffuse) Impoundment - water storage Unknown (pending investigation)	Unknown (pending investigation) Urban and Transport Water Industry Agriculture and rural land management
GB109057027280	Rhymney R - conf Nant Cylla to Chapel Wood	Fluoranthene Polyaromatic hydrocarbons (PAH)	N/A	Diffuse source Point source	Atmospheric deposition Contaminated water body bed sediments Sewage discharge (continuous)	Other (not in list) Urban and Transport Water Industry
GB109056026770	Rhosog Fach Reen - source to Severn Estuary	Invertebrates Macrophytes and Phytobenthos Combined	Nutrients Sediment	Physical modification Point source Diffuse source	Land drainage - water level management Urbanisation - other Unsewered domestic sewage Unknown (pending investigation)	Agriculture and rural land management Urban and Transport Domestic/ General public

Water body ID	Water body name	RNAG Class Element	Failing biological element	SWMI	Activity causing failure	Business Category
					Land drainage	
GB530905415401	Severn Lower	Brominated diphenylether (BDPE) Calc, Angiosperms, Mercury and Its Compounds	N/A	Diffuse source Point source Unknown (pending investigation)	Contaminated water body bed sediments Sewage discharge (continuous) Unknown (pending investigation) Atmospheric deposition	Industry, Manufacturing and other Business Water Industry Unknown (pending investigation) Other (not in list)

RNAG = Reason for not Achieving Good (WFD status), SWMI = Significant Water Management Issue.

4.2 Conclusion of screening assessment

Table 4 presents the failing WFD water bodies in the CC administrative area that may be impacted by the LFRMS Actions. Many of the WFD water bodies are failing due to physical modification and pollution as a result of human activity.

Of those water bodies that are failing to reach ‘Good’ overall WFD status in Table 4, it is likely that some of the proposed LFRMS Actions have the potential to improve the WFD status of water bodies. For example, LFRMS Actions referring to daylighting of existing culverts, keeping watercourses open, green infrastructure plans, flood risk management, habitat improvements can all contribute to improving the WFD status of water bodies by bringing a wealth of flood risk management and environmental benefits to CC’s administrative area.

Both the Taff and Ely Catchments have been highlighted as ‘Opportunity’ catchments by NRW for this cycle of WFD improvements.

5. Consultation

NRW have been consulted on the Strategic Environmental Assessment (SEA) Scoping Report and Habitats Regulations Assessment (HRA) Screening Report for CC's Local Flood Risk Management Strategy. NRW wrote a response to CC dated 02/08/2024.

NRW have listed a number of comments in response to CC's Local Flood Risk Management Strategy Strategic Environmental Assessment Scoping Report. Table 5 shows NRW's consultation comments that are relevant to WFD and how we have/plan to address each comment (p13 and 14 of NRW comments).

Table 5: Response to NRWs consultation comments on the SEA Scoping Report and the HRA Screening report

NRW comment	Response
Strategic Environmental Assessment Scoping Report	
A LFRMS has the opportunity to be detrimental or beneficial to implementing WFD mitigation measures.	This WFD Screening Assessment has been produced in response to this. As per NRW's guidance to local authorities: "All projects under the LFRMS being undertaken in the fluvial, estuarine, or coastal environment must undergo WFD compliance assessment. NRW's Advice Note on the Water Framework Directive for Local Authorities should be used to assess WFD compliance per project[10]".
Heavily Modified Waterbodies (HMWB) in CC should be included in the baseline information.	HMWBs in CC have been included in the baseline information in the SEA Environmental Report and WFD Screening Assessment.
There should be specific mention of Geomorphology/Hydromorphology - protections and restoration of geomorphology is essential to building or resilience of ecosystems.	The WFD Screening Assessment has noted potential for both positive and negative impacts upon hydromorphology. Relevant measures have also been noted: River basin management plans, updated 2022: summary programmes of measures – mechanisms - 8. Physical modifications and morphology - Guidance - GOV.UK (www.gov.uk)[11]
There is no mention of Opportunity Catchments – this is a focus for the current RBMP round – the Taff and Ely are focus catchments – this is a key omission to the SEA.	These are now noted in this assessment. Taff and Ely Opportunity Catchment included in this document Severn RBMP 2021_2027 Summary (naturalresources.wales)[12].
Please update the following: Mitigation measures should be included for Cardiff Bay as a failing element; The following two waterbodies are missing from Table 6; • Nant Clun - source to conf Ely R, and • Whitchurch Canal. Correct the failing elements listed in Table 6; The incorrect groundwater waterbodies have been included. The poor status is driven by 'Chemical Dependent Surface Water Body Status' – which relates to the potential for historic coal mining activities to impact upon surface waters.	These have been updated and corrected in the SEA Environmental Report. The water bodies that are listed in Table 6 tally with those in the WFD screening assessment.

[10] 20171030 Final Revised WFD Advice Note for Local Authorities (naturalresources.wales)

[11] River basin management plans, updated 2022: summary programmes of measures – mechanisms - 8. Physical modifications and morphology - Guidance - GOV.UK (www.gov.uk)

[12] Severn RBMP 2021_2027 Summary (naturalresources.wales)

6. Conclusions

LFRMS Actions have been screened for compliance with WFD objectives. Many have been screened out as they will not impact on the WFD Status of water bodies in the CC administrative area (Table 2).

The following actions have been screened in:

- CDFA2 - Develop and adopt a surface water management policy in line with Tan 15 guidance
- CDFA13 - Update Cardiff Council Culverting policy
- CDFA16 - Assist in the development and maintenance of Cardiff Council Green Infrastructure Plan
- CDFA17 - Review adopted Flood Risk strategy and associated action plans every 2 years
- CDFA18 - Assist Cardiff Council Planning Authority in the development of the SFCA and replacement LDP
- CDFA19 - Maintain Cardiff Councils Shoreline Management Plan
- CDFA20 - Ensure the adopted shoreline policy of "hold the line" is adhered to
- Rhy3 - Greener Rumney FBC
- Rhy4 - Greener Rumney Construction
- Taf1 - Partake in the River Taff Catchment Masterplan alongside NRW and other RMA's
- Taf2 - Greener Whitchurch Full Business Case / Detailed Design
- Taf3 - Greener Whitchurch Construction
- Taf4 - Radyr Court Road BJC
- Taf5 - Radyr Court Road Construction
- Taf6 - Nant Y Wedal OBC
- Taf7 - Nant Y Wedal FBC
- Taf8 - Nant Y Wedal Construction

Due to the nature of the Strategy, most of the actions screened in require future actions or project-level assessment to understand the impact upon WFD objectives.

The LFRMS has the potential to be detrimental or beneficial to implementing WFD mitigation measures. Opportunities to have a beneficial impact have been highlighted at a strategic level.

Figures