



Central Rhyl Coastal Defences

Water Framework Directive (WFD) Assessment

September 2021

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Central Rhyl Coastal Defences

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1 Introduction

1.1 Project background

1.1.1 Overview

This Water Framework Directive Regulations (WFD) Assessment has been prepared by Mott MacDonald Ltd (Mott MacDonald) for Balfour Beatty Civil Engineering Ltd (BB) on behalf of Denbighshire County Council (DCC) for the construction of the Central Rhyl Coastal Defence Scheme (hereafter referred to as 'the Scheme').

The Scheme, located in the central area of Rhyl waterfront, Denbighshire, North Wales, is dependent on obtaining sufficient funding and comprises coastal defence works in the form of scour protection, stepped concrete revetment, promenade raising, sea wall works, access and promenade improvements, and associated tie-in works.

Rhyl is a Victorian coastal resort and the largest town in Denbighshire, with a well-established history as a tourist destination. There are ongoing and future plans to regenerate Rhyl to enhance its appeal to tourists and investors; however, the coastal defences for the Central Rhyl frontage are deteriorating and there is the risk that this integral asset for Rhyl's regeneration could be lost without intervention.

Historically, Central Rhyl has been protected from coastal flooding by hard engineered defence structures constructed from at least the 1900s. These comprise a series of stepped revetments, recurve walls and vertical walls in various states of repair. The existing defences no longer meet acceptable performance standards and are known to be deteriorating.

The existing promenade in the area of the Scheme can become inundated during storms, causing flooding of the promenade and surrounding areas. In the future this will be exacerbated by the effects of climate change, which is predicted to increase both the frequency and magnitude of flooding. The existing coastal defences and promenade require improvements to safeguard the area from overtopping with consideration given to the potential effects of climate change.

Subject to funding, this Scheme aims to improve the existing coastal defences to provide increased flood and erosion protection to people and property in Rhyl along with supporting local regeneration, achieving wider community benefits alongside flood risk management.

1.1.2 Scheme location

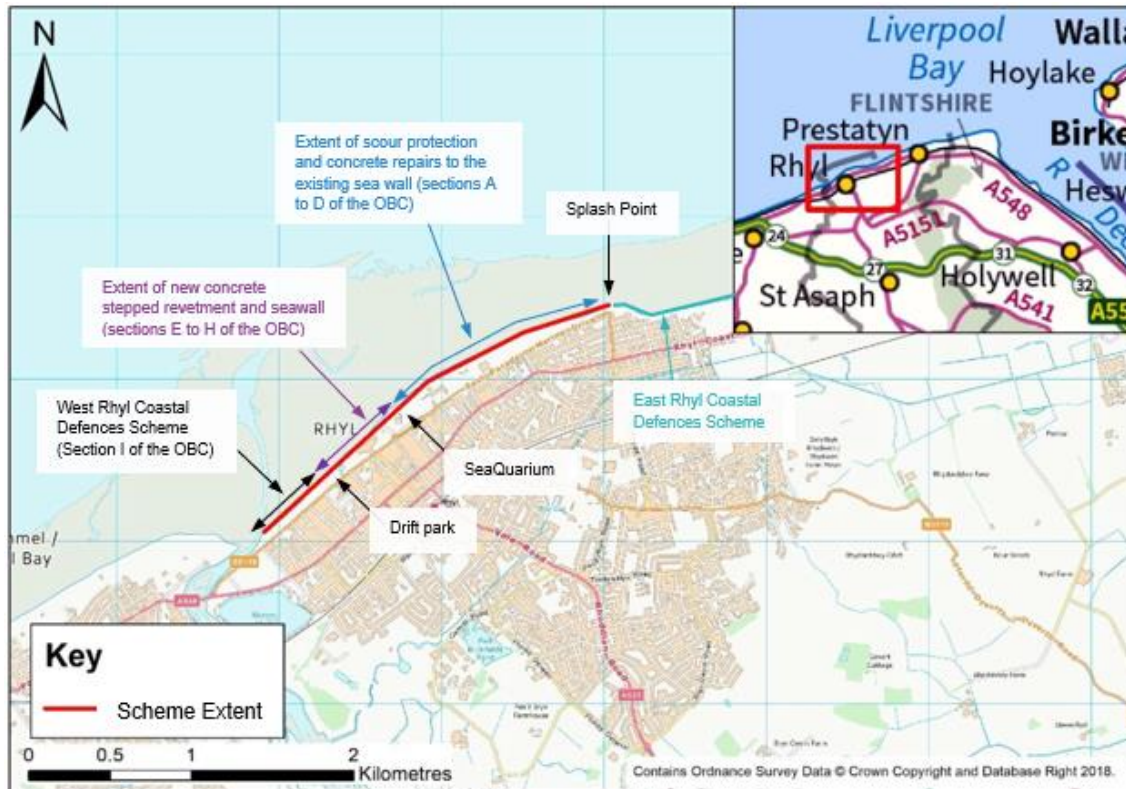
The Scheme is located along the coastal frontage of the town of Rhyl, North Wales. It extends from approximately 400m east of the mouth of the River Clwyd, to just west of Splash Point (and the start of the East Rhyl Coastal Defence Scheme, which was under construction at the time of writing this report). Figure 1.1 presents the approximate extent of the Scheme as outlined by the Central Rhyl Coastal Defences Outline Business Case (OBC) (DCC, 2019)¹.

As part of the OBC, the Scheme was split into nine sections along its length: sections A – I, with Section A at the eastern end and Section I at the western end.

¹ Denbighshire County Council, 2019. Central Rhyl Coastal Defence Scheme Outline Business Case.

The western end of the Scheme (i.e. west of Drift park and OBC Section I) is the location of the West Rhyl Coastal Defences Scheme. The West Rhyl Coastal Defences Scheme was constructed in 2015, and no further works are proposed at this location.

Figure 1.1: Scheme location and sections as per the Central Rhyl Coastal Defences OBC



Source: Central Rhyl Coastal Defence Scheme OBC, DCC, October 2019. Additional annotations by Mott MacDonald Ltd 2021

The national grid references for the western and eastern Scheme boundaries are (300223,381323) and (301998,382433) respectively. The Scheme is located along approximately 2.15km of coastline from the western end of the children's play area near River Street in the west to Tynewydd Road in the east.

The area of permanent construction is located along the beach adjacent to and over the northern-most area of the promenade. In this area, the beach predominantly comprises intertidal soft sediment and sand with some intertidal gravel and cobbles, predominantly at the landward edge. There are a limited number of slipways for vehicular beach access.

The principal highways bounding the southern side of the promenade are West Parade for the western half of the Scheme area (west of the SeaQuarium) and East Parade becoming Marine Drive to the far east.

1.2 Existing defence condition

Historically, central Rhyl has been protected from coastal flooding by hard engineered defence structures. These comprise a series of stepped revetments, recurve walls and vertical walls in various states of repair. A sand beach and timber groyne field fronts the hard defences, offering

some protection to the toe of the vertical structures. Much of the frontage also has fixed or demountable secondary defences that are typically located to the rear of the promenade.

Much of the existing defences are in poor to very poor condition, with some sections effectively being life expired. In these areas numerous defects have been observed during surveys including weak/eroded concrete, signs of movement, failing repair work, cracking, delamination, additional loading, lack of reinforcement and absence of protective revetment. These defects have the potential to compromise the overall integrity of the defences in the future, resulting in increased coastal erosion and flood risk to Rhyl.

In addition, beach lowering processes were noted throughout the frontage, leaving the toe of the defence vulnerable to failure through scour and beach lowering in the short term.

1.3 Scheme proposals

The Scheme red line boundary can be seen in Appendix A of this report.

1.3.1 Coastal Works

The Scheme is to include the following key coastal works:

- The construction of approximately 1.45km of scour protection and concrete repairs, from Splash Point to the SeaQuarium (sections A to D of the OBC, see Figure 1.1). The scour protection will consist of boulders being placed at the base of the existing coastal defence structures;
- The construction of approximately 750m of new concrete stepped revetment, from the SeaQuarium to opposite Drift Park (sections E to H of the OBC, see Figure 1.1);
- New pedestrian beach accesses through the proposed revetments to replace the existing ones and extension of existing beach accesses through the rock scour protection; and
- The extension of outfalls and protection works to existing outfalls that would be covered by the new revetment.

1.3.2 Promenade works

The Scheme also includes the following works to the promenade:

- Raised promenade from the SeaQuarium to opposite Drift Park (sections E to H of the OBC, see Figure 1.1);
- New seawalls at the back of the promenade from the SeaQuarium to opposite Drift Park (sections E to H of the OBC, see Figure 1.1);
- New flood gates for access points through the new rear seawalls between the SeaQuarium and opposite Drift Park;
- New retaining structures where appropriate at the back of the promenade between the SeaQuarium and opposite Drift Park, to accommodate level differences between the raised promenade and adjacent land; and
- New ramps or steps to provide access to raised promenade between the SeaQuarium and opposite Drift Park.

1.3.3 Management and maintenance

The Scheme includes future management and maintenance actions comprising:

- Inspection, maintenance and repair of coastal defence structures;

- Inspection, maintenance and repair of Promenade and sea wall;
- Inspection, maintenance and repair of accesses, drainage, highways, lighting and other minor assets;
- Management of wind-blown sand;
- Maintenance of landscaping; and
- Beach management.

1.4 Purpose of WFD assessment

Given the nature of the Scheme, the works require a WFD Assessment to determine the effects of the Scheme on ecological, hydromorphological and chemical quality and identify any potential impacts that could cause deterioration in the current status of the waterbody or could hinder the waterbody from meeting its WFD objectives in the future.

2 Legislation and assessment methodology

2.1 Legislative context

The WFD is originally European legislation which aims to protect and improve the water environment within member states of the EU. The WFD was transposed into UK law in 2003 by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003. Following Britain's exit from the EU, these Regulations were revoked and replaced with the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. Natural Resources Wales (NRW) is the statutory body responsible for implementing the WFD Regulations in Wales.

The WFD requires the identification and setting of objectives for protecting and improving 'waterbodies'. Waterbodies include rivers, streams, lakes, reservoirs, estuaries, coastal waters, canals and groundwaters. The standard objective is to achieve 'good status', or 'good potential' (if the waterbody is artificial or heavily modified). Further to this, the WFD must prevent deterioration in status for all waterbodies. The original target date for all waterbodies to achieve 'good status' was 2015; however, this can be extended to either 2021 or 2027. Good 'status' or 'potential' is designated based on the assessment of ecological and chemical components in surface waters. Ecological status consists of biological quality elements, physico-chemical supporting elements and hydromorphological supporting conditions. For groundwater, status consists of quantitative and qualitative elements. The WFD environmental objectives are outlined in Table 2.1.

Table 2.1: WFD environmental objectives

Objectives (from Article 4 of WFD)	Reference and description
4.1(a)(i)	WFD1 - Member States shall implement the necessary measures to prevent deterioration of the status of all bodies of surface water.
4.1(a)(ii)	WFD2 - Member States shall protect, enhance and restore all bodies of surface water, subject to the application of subparagraph (iii) for artificial and heavily modified bodies of water, with the aim of achieving good surface water status by 2015.
4.1(a)(iii)	WFD3 - Member States shall protect and enhance all artificial and heavily modified bodies of water, with the aim of achieving good ecological potential (GEP) and good surface water chemical status by 2015.
4.1(a)(iv)	WFD4 - Progressively reduce pollution from priority substances and cease or phasing out emissions, discharges and losses of priority hazardous substances.
4.1(b)(i)	WFD5 - Prevent Deterioration in Status and prevent or limit input of pollutants to groundwater.

Source: Water Framework Directive 2000/60/EC²

River Basin Management Plans (RBMPs) set out how organisations, stakeholders and communities will work together to improve the water environment. RBMPs report the baseline status of waterbodies within each River Basin District (RBD), corresponding to WFD reporting

² Directive 2000/60/EC of the European Parliament and the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (2000), Accessed online: https://eur-lex.europa.eu/resource.html?uri=cellar:5c835afb-2ec6-4577-bdf8-756d3d694eeb.0004.02/DOC_1&format=PDF

cycles. The first RBMPs were published in 2009 for RBMP Cycle 1 and were updated for RBMP Cycle 2 in 2015. RBMPs are reviewed and updated every six years so a new RBMP is due to be published in 2021. The Scheme is within the Western Wales RBMP.

Waterbodies can be classified as artificial (waterbodies created in a location where no waterbody existed before), or heavily modified (waterbodies where the natural conditions have been substantially altered for human benefit and have substantially changed in character).

Mitigation measures are identified to achieve 'Good Ecological Potential' for Artificial Waterbodies (AWB) or Heavily Modified Waterbodies (HMWB), in lieu of the ability to achieve 'Good Ecological status' seen in natural waterbodies. Mitigation measures are practicable steps that can be taken to reverse or offset adverse impacts from human activities such as impoundments for water resources, power generation or structures that provide flood defence.

2.2 Guidance

The most applicable guidance for WFD assessment in Wales is:

- Guidance for assessing activities and projects for compliance with the Water Framework Directive, *Natural Resources Wales*, 2018.
- NRW OGN 072: Complying with the Water Framework Directive Regulations 2017: how to assess and appraise projects and activities, *Natural Resources Wales*, Jan 2021.

2.3 Assessment methodology

This WFD assessment has been informed by a desk-based study based on publicly available data and follows the guidance from government documents outlined in Section 2.2.

2.3.1 WFD baseline

The WFD Baseline will identify the WFD waterbodies including:

- River waterbodies;
- Groundwater catchment waterbodies; and,
- Designated sites / Protected Areas.

This baseline has been informed by a desk-based analysis of publicly available information using sources as seen in Table 2.2.

Table 2.2: Desk-based study sources

Source	Link	Description
Natural Resources Wales - Watch Water Wales	Water Watch Wales (naturalresourceswales.gov.uk)	Provides information on the WFD waterbodies.
Natural Resources Wales Portal - Lle Map	Lle - Map (gov.wales)	Provides information on the WFD waterbodies, potential environmental constraints, Protected Areas and designated sites.
Natural Resources Wales - River Basin Management Plans (RBMPs)	Natural Resources Wales / River Basin Management Plans 2015 - 2021	Provides information on the designated River Basin Management Plans; the progress reports and the objectives.
National Library of Scotland – Map Images	Side by side georeferenced maps viewer - Map images - National Library of Scotland (nls.uk)	Comparison for historic Ordnance Survey (OS) maps and present-day mapping, allowing long-term changes in river morphology and planform to be identified.
Department of Environment, Food & Rural Affairs and (Defra) – MAGIC Map	MAGIC (defra.gov.uk)	Provides information on the WFD waterbodies, potential environmental constraints, Protected Areas and designated sites.

Due to the nature and implied connectivity of the coastal environment, waterbodies within a 5km radius have been assessed within the WFD screening.

2.3.2 Stage 1: WFD screening assessment

The WFD Screening Assessment determines whether the Scheme needs to be screened in or out for further assessment. This is based on the NRW WFD Guidance report³, as summarised in Appendix B.

If the proposed works are not listed in Table 5 or Appendix 2 of the 2018 NRW WFD Guidance report, the Scheme has to be assessed against the WFD risk screening thresholds (Section 2.3.2.1).

2.3.2.1 WFD Risk screening thresholds

WFD risk screening thresholds help determine if the activity poses a risk to the delivery of WFD objectives and indicates whether further assessment is needed.

The thresholds look at the type of physical works proposed and the length of waterbody that might be affected. The combination of these two factors provides a red, amber or green ‘traffic light’ system that indicates the level of potential WFD Risk (Table 2.3).

³ Guidance for assessing activities and projects for compliance with the Water Framework Directive, *Natural Resources Wales*, 2018.

Table 2.3: WFD risk traffic light system

Colour	Risk to delivery of WFD objectives	Need for further assessment
Green	None - Low ⁴	No further assessment required.
Amber	Medium – High, depending on the sensitivity of the location.	Yes – further assessment required. These activities should be sent for review by area geomorphology, fisheries and biodiversity experts.
Red	High	Yes – further assessment required. These activities should be sent for review by area geomorphology, fisheries and biodiversity experts.

Source: NRW WFD Guidance report

2.3.3 Stage 2: WFD scoping assessment

This stage aims to identify elements within waterbodies which may be impacted as a result of the activity. As part of scoping, the focus is on identifying components of the Scheme that may have the potential to cause and impact and the quality elements (Chemical status and Ecological status) potentially impacted.

Waterbodies can be scoped out at this stage if it can be robustly demonstrated that there will be no impacts. The process of the Scoping assessment is summarised in Appendix B.

2.3.4 Stage 3: detailed compliance assessment

This stage considers the potential impacts of an activity, identified ways to avoid or minimise impacts, and concludes if the activity may prevent any quality element within any waterbody achieving good status/potential or may cause deterioration.

Mitigation measures and recommendations are proposed in this section to ensure the Scheme is WFD compliant.

⁴ Green activities still need to be screened for high status, designations and wider environment, and activities must still be undertaken in line with pollution prevention and invasive species best practise guidance.

3 Stage 1: WFD screening

3.1 Scope of works at risk of affecting the water environment

The following elements of the Scheme have the potential to impact the water environment and have been screened into the assessment.

- Construction Works:
 - Construction of rock scour protection and concrete repairs;
 - Construction of new concrete revetment and associated beach access points;
 - Extension of outfalls and protection works to existing outfalls; and
 - Construction of raised promenade and associated retaining structures.
- Maintenance / Operational:
 - Inspection, maintenance and repair of coastal defence structures;
 - Inspection, maintenance and repair of accesses, drainage, highways, lighting and other minor assets;
 - Management of wind-blown sand; and
 - Beach management.

3.2 WFD screening assessment

By applying the methodology outlined in Appendix B, this section will identify the waterbodies that may be impacted by the screened in activities, as such, these waterbodies will require further assessment in Stage 3. This section will identify the activities that **may cause deterioration** or **prevent a waterbody from meeting its objectives**, as such, these activities will be screened-in and assessed further.

The Scheme's proposed activities are not listed within Appendix A2.2 of the NRW Guidance, indicating a potential risk and therefore it is considered all of the proposed activities require further assessment and should be considered at Stage 3.

4 Stage 2: WFD scoping assessment

This stage identifies waterbodies and WFD quality elements that are at risk from the Scheme's proposed activities and require further assessment.

4.1 WFD waterbody Identification

The Scheme is located on the coast of North Wales, adjacent to the mouth of Afon Clwyd. The following WFD waterbodies have been identified within close proximity of the Scheme:

- North Wales Coastal Waterbody (GB641011650000); Scheme within waterbody;
- Clwyd Permo-Triassic Sandstone Groundwater Waterbody (GB41001G202100); Scheme within waterbody; and,
- Clwyd Transitional Waterbody (GB541006608000); Scheme adjacent to waterbody.

The Scheme is not located within a river waterbody catchment area. The closest river waterbody catchments within 5km of the Scheme are;

- Gele (GB110066059980); approximately 0.91km west of the Scheme, separated by Afon Clwyd;
- Glanfyddion Cut (GB110066059990); approximately 2.9km south; and,
- Pont Robin Cut (Bodelwyddan)(GB110066059970); approximately 3.1km south, separated by Afon Clwyd.

4.2 WFD scoping assessment

By applying the methodology outlined in Appendix B, this section will identify the waterbodies that may be impacted by the screened in activities, as such, these waterbodies will require further assessment in Stage 3.

The Scheme's proposed activities are not listed within Appendix A2.2 of the NRW Guidance, indicating a potential risk and therefore Table 4.1: uses expert judgement (nature of proposed activities and distance to Scheme) to determine which WFD waterbodies have been screened-in or -out of the assessment.

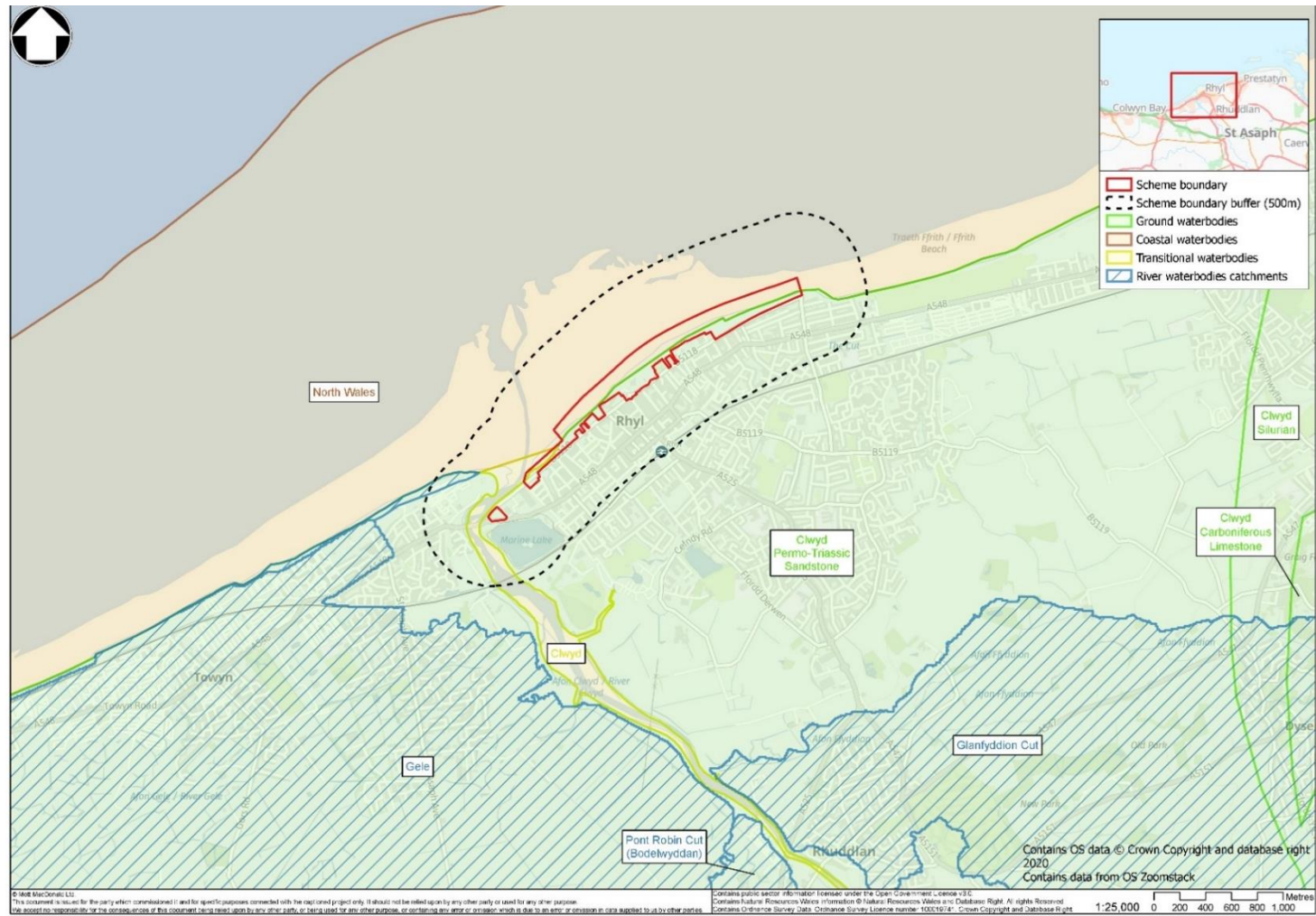
Table 4.1: Screening outcomes

Waterbody name	Waterbody ID	Reason	Scoping outcome
Coastal Waterbodies			
North Wales	GB641011650000	The Scheme is within this waterbody. The Scheme will change the morphology of the area to prevent the risk of flooding, as such there is a potential for the Scheme to impact the waterbody's objectives during construction.	Scoped - in
Groundwater Bodies			
Clwyd Permo-Triassic Sandstone	GB41001G202100	The Scheme does not involve groundwater abstraction. Any piling works are anticipated to be along the coastline on the edge of the waterbody catchment and it is not considered for the works to alter flow paths, create pollution pathways or for the waterbody's objectives to be impacted.	Scoped-out
Transitional Waterbodies			
Clwyd	GB541006608000	The waterbody is adjacent to the western border of the Scheme and, as such, has the potential to impact the waterbody's objectives during construction.	Scoped - in
River Waterbodies			
Rhyl Cut	GB110066060000	The Scheme is approximately 1.5km west of this waterbody. The Scheme is not immediately connected to this waterbody therefore, it is not anticipated for the waterbody's objectives to be impacted by the Scheme.	Scoped-out
Gele	GB110066059980	The Scheme is approximately 1.8km west of this waterbody. The Scheme is not immediately connected to this waterbody therefore, it is not anticipated for the waterbody's objectives to be impacted by the Scheme.	Scoped-out
Glanfyddion Cut	GB110066059990	The Scheme is approximately 2.9km west of this waterbody. The Scheme is not immediately connected to this waterbody therefore, it is not anticipated for the waterbody's objectives to be impacted by the Scheme.	Scoped-out

4.3 WFD Baseline of scoped-in waterbodies

A visual representation of the identified WFD waterbodies is provided in Figure 4.1, and a summary of the Baseline WFD status of the waterbodies is provided in Table 4.2:.

Figure 4.1: WFD Waterbodies



Source: Mott MacDonald, 2021

Table 4.2: Summary of scoped-in WFD baseline status⁵

Waterbody parameters	Waterbody name	
	North Wales	Clwyd
Waterbody ID	GB641011650000	GB541006608000
Waterbody Type	Coastal	Transitional
Waterbody Area (km ²)	146.278	0.644
Distance from Scheme	0m (within)	0m (adjacent)
Hydromorphological Designation	Heavily Modified	Heavily Modified
Overall Status	Moderate	Moderate
Chemical Status	Fail	Good
Dissolved Inorganic Nitrogen	Good	Unknown
Dissolved Oxygen	High	Unknown
Annex 10 chemicals, priority hazardous substances and other pollutants	Fail	Good
Ecological Status	Moderate	Moderate
Invertebrates	Good	Unknown
Phytoplankton	High	Unknown
Waterbody Objectives and Measures (2017)		
Failing WFD elements	Dissolved Inorganic Nitrogen, Mercury	Angiosperm, Mitigation Measures Assessment, Saltmarsh
Overall Status	Good by 2021	Good by 2027
Chemical Status	Good by 2021	Good by 2015
Ecological Status	Good by 2021	Good by 2027

Source: Water Watch Wales Cycle 2, 2015

4.4 Protected areas

Wider environmental legislation must be considered when assessing the compliance of proposals under WFD. Proposals cannot be WFD compliant if they adversely affect the integrity of protected areas; WFD aims to achieve relevant standards or objectives for these sites.

Table 4.3: identifies the Protected Areas within 2km of the Scheme to be considered within the Detailed Assessment, a visual representation of the Protected Areas is provided in Appendix C.

No Sites of Scientific Interest (SSSI), Special Areas of Conservations (SAC), Ramsar sites or local designations were identified within 2km of the Scheme.

Nitrate Vulnerable Zones (NVZ) have been designated within the RBMPs to identify areas where nitrate concentrations in waterbodies are high or increasing, or waterbodies are, or may become, eutrophic due to agricultural nitrate pollution. NVZ 135 has been identified to the south

⁵ Unknown: No information was provided in the Water Watch Wales Classification spreadsheet.

of the Scheme. It is not anticipated for the Scheme to create new/or impact groundwater pathways, therefore NVZs have not been considered further.

Table 4.3: WFD Protected areas identified

Protected Area type	Name	Distance from Scheme	Associated WFD Catchments
Special Protection Areas (SPA)	Liverpool Bay / Bae Lerpwl	1km north	North Wales (GB64101165000)
Bathing Waters	Rhyl East	0m (within)	North Wales (GB64101165000)
	Marine Lake, Rhyl	0.4km south	Clwyd (GB541006608000)
	Rhyl	1km north	North Wales (GB64101165000)

Source: Water Watch Wales, NRW

4.4.1 Sensitive Habitats

The following 'WFD sensitive habitats' have been identified within 500m of the Scheme:

- Higher Sensitivity Habitats:
 - Mussel Beds (A1.22, A2.72, A5.62, A4.24, A3.361); and,
 - Saltmarsh (A2.5).
- Lower Sensitivity Habitats:
 - Gravel & Cobbles (A2.1, A5.1);
 - Intertidal Soft Sediment (A2.2, A2.3, A2.4);
 - Subtidal Soft Sediment (A5.2, A5.3, A5.4); and,
 - Rocky shore (A1).

Sabellaria alveolate Reefs have been identified within 100m of the Scheme, with two patches of the habitat considered large enough to form the reef biotope (a habitat of principle importance), as such, this habitat is to be considered within this WFD assessment.

4.5 WFD Elements Scoping Assessment

During construction, the Scheme may present potential risks to a number of WFD quality elements. These include:

- Hydromorphology;
- Biology – habitats;
- Biology – fish;
- Protected areas;
- Water quality; and,
- Invasive and non-native species (INNS).

Table 4.4: and Table 4.5 details the potential risk from the Scheme to each of these WFD quality elements in the scoped in waterbodies (North Wales Coastal Waterbody and Clwyd

Transitional Waterbody, respectively) and determines which area at risk and require to be progressed to Stage 3.

Table 4.4: Scoping in/out of WFD quality elements for North Wales coastal waterbody

WFD Quality Element	Consideration of Scheme activity	Potential risk?	Stage 3 Assessment required?
Hydromorphology	Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status?	No. Overall status is Moderate	X
	Could significantly impact the hydromorphology of any water body (including morphological conditions and tidal patterns)?	No. The Scheme has the potential to alter the morphological conditions along the coastal frontage, however, this is anticipated to be locally. Given the size of the waterbody in comparison to the footprint of the Scheme, it is not anticipated for the change in morphology to be significant in terms of the waterbody as a whole. In addition, there is extensive coastal protection along the frontage of the coastal waterbody, therefore, the Scheme is considered to be relatively minor in relation to the entire waterbody.	X
	Physical footprint is greater than 1% of surface area of water body or greater than 0.5km ² ?	No. The area within the redline boundary is 0.43km ² , and the area of permanent construction is anticipated to be approximately 0.24km ² . These areas are 0.29% and 0.16% of the waterbody, given the size of the waterbody in comparison to the footprint of the Scheme, it is not anticipated for the Scheme size to be significant in terms of the waterbody as a whole.	X
	Is in a water body that is heavily modified for the same use as the activity?	Yes. The waterbody is heavily modified for coastal protection.	✓
Priority Habitats and Species	Physical footprint is greater than 1% of surface area of water body or greater than 0.5km ²	Yes. The Scheme is located along approximately 2.15km of the coastline. However, given the size of the waterbody in comparison to the footprint of the Scheme, it is not anticipated for the Scheme size to be significant in terms of the waterbody as a whole.	X
	Is within 500m of any higher sensitivity habitat?	Yes. There are multiple clusters of Mussel Beds and <i>Sabellaria alveolate</i> Reef within 500m of the Scheme.	✓
	1% or more of any lower sensitivity habitat?	Yes. The Scheme covers more than 1% of lower sensitivity habitats. However, due to the vast coverage of the habitat across the coastal frontage and within the entire waterbody, it is considered for the Scheme be relatively minor in relation to the entire waterbody.	X
Biology - fish	Will impact on normal fish behaviour like movement, migration, spawning; species composition and abundance; or mechanical injury?	No. No physical barriers, chemical changes, habitat changes, significant changes to water quality or quantity, no changes to depth or flow is anticipated to impact fish behaviour.	X
	Is in a transitional water body and could affect fish?	No. Coastal Waterbody	X
	Is outside of a transitional water body and could impact upon migratory fish?	No. No physical barriers to impact migratory fish.	X

WFD Quality Element	Consideration of Scheme activity	Potential risk?	Stage 3 Assessment required?
Water Quality	Could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)	No. The works within the inter tidal zone will be undertaken at low tide, minimising the potential impact on water quality. I	X
	Is in a water body with a phytoplankton status of moderate, poor or bad	Yes. Phytoplankton status is Moderate	✓
	Is in a water body with a history of harmful algae	No.	X
	Puts water quality at risk from your activity through the use, release or disturbance of chemicals	No. Release or disturbance of chemicals is not anticipated.	X
Protected Areas	Within 2km of any WFD protected area	Yes. The Scheme is within a Bathing Water Area, and a SPA is within 2km.	✓
INNS	Introduce or spread INNS (including materials or equipment that have come from, had use in or travelled from other water bodies; or activities that help spread INNS).	No. There is a potential risk for the introduction of INNS through material and plant activity into the adjacent waterbody, however, mitigation measures will be included in the Construction Environment Management Plan. Therefore, the risk of INNS can be scoped out.	X

Table 4.5: Scoping in/out of WFD quality elements for Clwyd transitional waterbody

WFD Quality Element	Consideration of Scheme activity	Potential risk?	Stage 3 Assessment required?
Hydromorphology	Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status?	No. Overall status is Moderate	X
	Could significantly impact the hydromorphology of any water body (including morphological conditions and tidal patterns)?	No. The Scheme is not anticipated to impact the hydromorphology of the transitional waterbody.	X
	Physical footprint is greater than 1% of surface area of water body or greater than 0.5km ² ?	No. The Scheme is located adjacent to this waterbody with no works within the waterbody.	X
	Is in a water body that is heavily modified for the same use as the activity?	No. The Scheme is adjacent to this waterbody and is not anticipated to be directly impacted by the Scheme.	X
Priority Habitats and Species	Physical footprint is greater than 1% of surface area of water body or greater than 0.5km ²	Yes. The Scheme is located along approximately 2.15km of the coastline. However, given the size of the waterbody in comparison to the footprint of the Scheme, it is not anticipated for the Scheme size to be significant in terms of the waterbody as a whole.	X
	Is within 500m of any higher sensitivity habitat?	Yes. There are patches of Saltmarshes within 500m of the Scheme, however, the Scheme is not anticipated to directly impact these habitats or for the water quality to change to indirectly impact these habitats. Providing standard best practice measures are adhered to, this element is not considered further.	X
	1% or more of any lower sensitivity habitat?	No. The Scheme does not cover any lower sensitivity habitats within this waterbody as the proposed works are adjacent to this waterbody.	X
Biology - fish	Will impact on normal fish behaviour like movement, migration, spawning; species composition and abundance; or mechanical injury?	No. The Scheme is adjacent to this waterbody and is not anticipated to directly impact fish behaviour within the waterbody.	X
	Is in a transitional water body and could affect fish?	No. The Scheme is adjacent to this waterbody and is not anticipated to directly impact fish within the waterbody.	X
	Is outside of a transitional water body and could impact upon migratory fish?	No. The Scheme is adjacent to this waterbody and is not anticipated to directly impact fish migration within the waterbody.	X
Water Quality	Could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer	No. The majority of the works will be undertaken at low tide in the adjacent waterbody, minimising the potential impact on the water quality. If marine vessels are required for the works, there is a potential for an increase in turbidity levels in the surrounding waterbodies, however,	X

WFD Quality Element	Consideration of Scheme activity	Potential risk?	Stage 3 Assessment required?
	than a spring neap tidal cycle (about 14 days)	this would not be continuous , and any impact would be temporary and limited to the construction phase.	
	Is in a water body with a phytoplankton status of moderate, poor or bad	No. Phytoplankton status is Unknown	X
	Is in a water body with a history of harmful algae	No.	X
	Puts water quality at risk from your activity through the use, release or disturbance of chemicals	No. Release or disturbance of chemicals is not anticipated.	X
Protected Areas	Within 2km of any WFD protected area	Yes. There is a Bathing Waters area within this waterbody which may be impacted by the Scheme.	✓
INNS	Introduce or spread INNS (including materials or equipment that have come from, had use in or travelled from other water bodies; or activities that help spread INNS).	No. There is a potential risk for the introduction of INNS through material and plant activity into the adjacent waterbody, however, mitigation measures will be included in the CEMP. Therefore, the risk of INNS can be scoped out.	X

4.6 In-combination impacts

This section identifies the plans and projects proposed within 2km of the Scheme which may result in in-combination impacts on the marine environment. This section only includes plans/projects which have been applied for, as required by the NRW Guidance Document.

The following projects have been identified:

4.6.1 Projects within 2km of the Scheme

4.6.1.1 East Rhyl Coastal Defences Scheme

The East Rhyl Coastal Defences Scheme is located in Rhyl, adjacent to the eastern boundary of the Scheme and is led by DCC with support from the Welsh Government. The project will help protect the area from current storms, flooding and sea level rises.

The East Rhyl Coastal Defences Scheme comprise a rock armour revetment designed to absorb wave energy during future storm events. The rock armour is approximately 600m long by 30m wide. The sea wall is also being replaced with a larger structure and the promenade is being raised by less than 1m to maintain views of the sea from the coastal path.

The East Rhyl Coastal Defences Scheme rock revetment works is currently under construction, with the anticipated project completion in early summer 2022, as such there will be an overlap with the Scheme and potential in-combination impacts is to be assessed further.

Brief overview of the project:

- Distance from Scheme: Within RLB;
- Funding: CRMP (Welsh Government);
- Current stage: Construction;
- Length: 600m;
- Outline description: Rock revetment;
- Construction start date (funding dependent): Late spring 2019; and
- Anticipated construction period: Complete early Summer 2022.

4.6.1.2 Llanddulas to Kinmel Bay Coastal Defence Improvements (Conwy County)

This project comprises of a number of sites across 11km of coastline and involves coastal defence improvements occurring across the sites. The nature of coastal defence improvements depends on the existing condition of the defences. The section of particular interest in relation to the Scheme is the work proposed at Kinmel Bay beach due to the close proximity to the Scheme works.

Kinmel Bay beach works will comprise enhancement of the rock revetment at the eastern end (~450m), reprofiling of car park entrance, upgrade/ replacement of flood gate to be at the same level as the wall, raising of seawall crest by ~300mm along the length of the unit in question and reinstatement of sand dunes where necessary along the stretch to the east of the car park at the end of St Asaph Avenue where gaps exist along the landward side of the foot/cycle path.

Brief overview of the project:

- Distance from Scheme: ~340m (to Quay Street car park compound) from eastern extent (opposite side of Clwyd Estuary);
- Funding: CRMP (Welsh Government);

- Current stage: Detailed Design;
- Length: Six sites over an 11km length of coastline (not continuous);
- OBC works description: Various interventions across a number of sites;
- Construction start date (funding dependent): 2022; and
- Anticipated construction period: Approximately 2 years intermittently.

At the time of writing, this project was not proceeding with a planning application, however it is understood the project would be shortly applying for one, with construction commencing at a similar time as the Scheme. Therefore, there is a potential for this project to overlap with the Scheme and potential in-combination impacts is to be assessed further.

4.6.1.3 Central Prestatyn Coastal Defence Improvements

The Central Prestatyn Coastal Defence improvements project involves the creation of a new flood embankment set back from the existing defence. It is being led by DCC with support from the Welsh Government. It would surround the western, southern and eastern boundaries of Rhyl Golf Course, situated along the Rhyl Coast Road.

The project will include construction of an embankment approximately ~1.66km long, sheet piles will run down the centre of the embankment, rite-in rock revetments, patch repairs to the steps of the promenade, and two rock armour scour protection areas (totalling ~30m in length), along the toe of the existing stepped revetment to provide protection to the existing defence against the risk of undermining from discharged flood water through the new culverts.

Brief overview of the project:

- Distance from Scheme: ~400m from eastern extent of RLB;
- Funding: CRMP (Welsh Government);
- Current stage: Detailed Design;
- Length: ~1.66km landward embankment;
- Outline description: Flood embankment construction;
- Construction start date (funding dependent): Spring 2022; and
- Anticipated construction period: Until late 2025.

At the time of writing, this project was not proceeding with a planning application, however it is understood the project would be shortly applying for one. The construction timeline is expected to be Spring 2022, therefore, there is a potential for this project to overlap with the Scheme and potential in-combination impacts is to be assessed further.

4.6.2 Other coastal defence projects along the North Wales Coast

4.6.2.1 Colwyn Bay Waterfront Project (Old Colwyn / Phase 2b)

Colwyn Bay is located around 13km to the west of the Scheme. The Colwyn Bay Waterfront Project was conceived in 2007 as a result of the strategic assessment of options for future flood and coastal erosion risk management. During the strategic assessment process it was identified that maintaining or improving the aging defences alone would not attract people to Colwyn Bay as this approach would not address the low beach levels present and there was strong public support to determine a more robust solution to be used as the catalyst for regeneration within the wider Colwyn Bay area.

There are numerous phases of work with some phases complete and others due to commence construction (funding and permission dependent) within the next year:

- Phase 1 (a, b, c): 150m rock groyne structure, linear rock revetment and sheet piled wall, beach recharge and promenade enhancement works including the construction of Porth Eirias. Completed October 2014;
- Phase 2a: Coastal regeneration, improved coastal defences (sea wall), access and promenade enhancements. Complete September 2017;
- Splashpoint: Emergency works completed, comprising a short section (300m of 30m deep rock revetment. Completion ongoing;
- Old Colwyn Waterfront Coastal Defence and Active Travel Scheme (formerly Phase 3): Construction of a 1.15km long ~32m wide rock revetment against the sea wall between Porth Eirias and Splashpoint. Construction anticipated September 2021; and
- Phase 2b: Beach recharge works (~1 million tonnes import of dredged sand to be imported to the beach via a pipeline from a dredging vessel off-shore), groyne improvements (no revetment import needed – revetment to be recycled) and promenade enhancements. Construction anticipated March 2022.

Brief overview of the project:

- Distance from Scheme: 13km;
- Funding: Resilient Roads (Old Colwyn)/CRMP (Phase 2b);
- Current stage: Construction (Old Colwyn)/detailed design (Phase 2b);
- Length: 1.2km (Old Colwyn)/0.8km (Phase 2b);
- OBC works description: Rock revetment (Old Colwyn)/Beach nourishment (Phase 2b);
- Construction start date (funding dependent): September 2021/March 2022; and
- Anticipated construction period: 2 years/12 months.

The construction works at Old Colwyn are currently underway, with the anticipation for Phase 2b to follow shortly, as such there will be an overlap with the Scheme and potential in-combination impacts is to be assessed further.

4.6.2.2 Penrhyn Bay Coastal Defences

At the time of writing, limited information was available for this project. The available current scope of works includes; the construction of a T-shaped rock armour groyne, beach nourishment adjacent to the groyne, public realm enhancements to the promenade, and rock armour.

Brief overview of the project:

- Distance from Scheme: 17km;
- Funding: CRMP;
- Current stage: Detailed Design;
- Length: 0.8km;
- OBC works description: Rock promontory;
- Construction start date (funding dependent): March 2022; and
- Anticipated construction period: Anticipated to be ~9 months

As the project is along the North Wales coast and has the potential to overlap with the Scheme, there is a potential risk of in-combination impacts which is to be assessed further.

4.6.2.3 Llandudno Coastal Defences

At the time of writing, the scope of works is not known, however there is a potential for the construction period to overlap.

Brief overview of the project:

- Distance from Scheme: 20km;
- Funding: CRMP (Welsh Government);
- Current stage: Detailed Design;
- Length: 1.6km (West Shore)/2.8km (North Shore);
- OBC works description: Increase height of sea wall by 300mm (West Shore)/possible beach nourishment (North Shore);
- Construction start date (funding dependent): March 2022; and
- Anticipated construction period: Unknown.

As the project is along the North Wales coast and has the potential to overlap with the Scheme, there is a potential risk of in-combination impacts which is to be assessed further.

4.7 Cumulative impacts

This section identifies potential cumulative impacts on the marine environment as a result of the Scheme and all developments already built and operational.

The North Wales coastal waterbody and Clwyd Transitional waterbody are heavily modified for the purpose of coastal defence. The surrounding developments are residential and commercial buildings. During operational, it is not anticipated for the Scheme and these developments to have cumulative impacts on the surrounding waterbodies. As such, the cumulative impacts will not be assessed further.

4.8 Summary

To conclude the Scoping Assessment, there is a potential for the Scheme to impact the ability of either North Wales Coastal Waterbody (GB64101165000) or the Clwyd Transitional Waterbody (GB541006608000) to achieve its objectives.

As the Scheme is within the North Wales Coastal Waterbody and the purpose is to install coastal defences to prevent flooding, there is a potential for the Scheme to impact on the waterbodies objective's, or ability to meet 'good' status. The Clwyd Transitional Waterbody is in close proximity to the Scheme and has the potential for the Scheme to impact the waterbodies objectives. Therefore, both waterbodies need to be further considered in the Stage 3: Detailed Assessment.

Impacts on the Protected Areas within or in close proximity of the Scheme, either during construction or operation, cannot be ruled out of the screening assessment. Therefore, these sites need to be further considered in the Stage 3: Detailed Assessment.

The WFD Elements to be considered further in the Stage 3: Detailed Assessment are summarised in Table 4.6:

Table 4.6: Summary of Scoped-in WFD Elements

WFD Quality Element		North Wales Coastal Waterbody		Clwyd Transitional Waterbody
Hydromorphology	ü	Development for coastal protection	X	Not considered further
Priority Habitats and Species	ü	Higher sensitivity habitats within 500m of the Scheme: Mussel beds	X	Not considered further
Biology – fish	X	Not considered further	X	Not considered further
Water Quality	ü	Phytoplankton status of Moderate	X	Not considered further
Protected Areas	ü	Liverpool Bay SPA, Rhyl East Bathing Waters, Marine Lake Bathing Waters, and Rhyl Bathing Waters	ü	Liverpool Bay SPA, Rhyl East Bathing Waters, Marine Lake Bathing Waters, and Rhyl Bathing Waters
INNS	X	Not considered further	X	Not considered further

The following projects have the potential for in-combination impacts as they are along the coastline;

- East Rhyl Coastal Defences Scheme;
- Llanddulas to Kinmel Bay Coastal Defence Improvements (Conwy County);
- Central Prestatyn Coastal Defence Improvements;
- Colwyn Bay Waterfront Project (Old Colwyn / Phase 2b);
- Penrhyn Bay Coastal Defences; and,
- Llandudno Coastal Defences.

5 Stage 3: Detailed compliance assessment

This stage considers the potential impacts of an activity, identifies ways to avoid or minimise impacts and concludes if the activity may prevent any WFD quality elements within any WFD waterbody achieving good status/potential or may cause deterioration.

Five receptors were identified as being at risk from the Scheme:

- Hydromorphology (development for coastal protection);
- Priority Habitats and Species (higher sensitivity habitats within 500m of the Scheme: Mussel beds and *Sabelliria* Reef);
- Water Quality (phytoplankton status of Moderate); and,
- Protected Areas (Liverpool Bay SPA, Rhyl East Bathing Waters, Marine Lake Bathing Waters, and Rhyl Bathing Waters).

5.1 Mitigation measures

In line with policy and best practice, the Scheme will produce a CEMP prior to construction to reduce potential risks to the environment. The CEMP will include, but not be limited to the following:

- Works on the intertidal area (to include piling activities) would be undertaken on the mid to low tide to reduce potential disturbance to SPA species, propagation of noise and vibration through the water column and suspension of sediment in the water column;
- Storage of fuels and chemicals to be above any flood water level/tidal area, and where possible away from high-risk locations (more than 10m from a waterbody);
- Refuelling of plant and equipment would only be permitted at designated refuelling areas. Fuel would be pumped into machines to minimise the risk of spillage. All refuelling and bulk deliveries would be supervised at all times;
- Pollution spill kits to be made available where required and Toolbox Talks are given to required staff;
- Visual monitoring of identified waterbodies; and,
- Throughout the construction and operational phases, best practice guidance in reference to pollution prevention would be followed; CIRIA (2015)⁶.

5.2 Detailed compliance assessment

A WFD Compliance assessment has been completed for each receptor for both WFD waterbodies (North Wales and Clwyd), as shown in Table 5.1: and Table 5.2 respectively

⁶ CIRIA 2015. Charles, P, Edwards, P (eds), Environmental good practice on site guide (fourth edition) (C741)

Table 5.1: Potential impacts on WFD status of the North Wales Coastal Waterbody

WFD Quality Element	Potential impacts	Compliance, mitigation and recommendations	Will the Scheme result in deterioration of WFD Quality Element?
Hydromorphology: Development for coastal protection	The construction of the revetment (sections E to H) will require excavation of beach material to provide a solid foundation. During the construction phase, machinery will track along the foreshore to excavate existing material and to place new materials. This could result in the loosening of beach material, making it more available for transporting along the frontage and to be suspended into the water column. However, works are to be undertaken at low water, reducing the potential for suspended solids. Material from the excavation will be evenly distributed along the foreshore following the construction of a section of revetment that was excavated. This will allow the material to remain in the system and maintain the sediment balance. The construction phase may lead to short term adverse impacts on sediment transport through the temporary placement of rock used for scour protection construction (in sections A to D) in the intertidal zone prior to re-location to its final location. It is assumed that rock would be stockpiled immediately seaward of its eventual location at the base of the existing revetments and seawalls. This temporary storage of materials may affect current localised sediment transport patterns, leading to settling out of materials in the vicinity of the stockpiled materials and the reduction in sediment transported along the frontage. It is considered that once the stockpiles have been removed the beach would return to its current state. The revetment in front of the existing seawall may result in the alteration of waves incident at the seawall. This will provide a less reflective surface and as such is expected to reduce scour and thus reduce further erosion and lowering of the beach along the frontage. However, with time beach levels are anticipated to reach equilibrium levels.	Standard best practice measures are to be followed throughout the construction phase, with a CEMP produced prior to construction works. On-spot visual monitoring is recommended to assess any visible changes to the waterbody. Stockpile locations would be agreed with the DCC and NRW once a Contractor has been appointed and recorded in the CEMP. During construction, to reduce short term negative impact on hydrodynamics and the sediment transport regime, materials, such as rock used for scour protection construction, will be stored as high up the beach as practicable, close to the working area. Where this is not possible, the size of the stockpile will be assessed to ensure that changes to the current flows are not creating areas of scour. Monitoring of the beaches around the stockpile will be undertaken and the beach levels reinstated should beach lowering be recorded. A Contractor-led beach inspection scheme will be agreed in advance with the DCC and NRW and detailed in the CEMP. Stockpiles will only be temporary and will not be permitted to remain beyond the end of the construction phase. Excavation of waste materials will be kept to the minimum required in order to allow a solid founding for new structures without the removal and disturbance of excess materials. This will minimise displacement of removed sediments onto the foreshore that might be dispersed leading to an increase in suspended sediments.	No - There is already extensive coastal protection along the frontage of the coastal waterbody. Any impacts to the waterbody are anticipated to be localised and not result in deterioration at the waterbody scale, as such providing embedded mitigation measures are implemented and standard best practice measures are followed, the Scheme would be WFD compliant.
Priority Habitats and Species⁷: Higher sensitivity habitats within 500m of the	Mussel Beds: Acoustic underwater noise and vibration from piling works have the potential to propagate through bedrock and sediment and impact shellfish species.	Standard best practice measures are to be followed throughout the construction phase, with a CEMP produced prior to construction works. On-spot visual	No - Any impacts to the waterbody are anticipated to be localised and not result in deterioration at the

⁷ Potential impacts and associated mitigation measures relating to the Priority Habitats and Species have been extracted from the Central Rhyl Coastal Defences Environment Statement Volume 1: Main Text, Biodiversity Chapter, Mott MacDonald, 2021.

WFD Quality Element	Potential impacts	Compliance, mitigation and recommendations	Will the Scheme result in deterioration of WFD Quality Element?
Scheme: Mussel beds and <i>Sabellaria</i> Reef	Water pollution through the risk of oil and fuel spills within the intertidal area could prove toxic to the shellfish species. An increase in turbidity from construction activities has the potential to reduce the levels of dissolved oxygen in the water column and impacting on the respiration rate of the shellfish species. <i>Sabellaria</i> Reefs: Water pollution through the risk of oil and fuel spills within the intertidal area could prove toxic to the shellfish species. An increase in turbidity from construction activities has the potential to reduce the levels of dissolved oxygen in the water column and impacting on the respiration rate of the shellfish species.	monitoring is recommended to assess any visible changes to the waterbody.	waterbody scale, as such providing embedded mitigation measures are implemented and standard best practice measures are followed, the Scheme would be WFD compliant.
Water Quality: Phytoplankton status of Moderate	The Scheme would not result in an increase in the amount of organic material being deposited into the waterbody and is not anticipated to result in any impact upon phytoplankton. During construction, there is a potential risk of water pollution from oil or fuel spills which could result in a deterioration of water quality of the waterbody.	Standard best practice measures are to be followed throughout the construction phase, with a CEMP produced prior to construction works detailing the practical and necessary measures required during construction to prevent the pollution of the surrounding environment. On-spot visual monitoring is recommended to assess any visible changes to the waterbody.	No - Any impacts to the waterbody are not anticipated to result in deterioration at the waterbody scale, as such providing embedded mitigation measures are implemented and standard best practice measures are followed, the Scheme would be WFD compliant.
Protected Areas: Liverpool Bay SPA, Rhyl East Bathing Waters, Marine Lake Bathing Waters, and Rhyl Bathing Waters	Liverpool Bay SPA⁸: Designated for the wintering and breeding bird assemblages it supports. Visual disturbance: During construction, the works have the potential to visually disturb birds due to the increase in human activity on the shoreline. Noise and Vibration: During construction, there will be an increase in noise and vibration which has the potential to disturb or displace foraging birds, especially during winter months. During construction, there is a potential risk of water quality deterioration from oil or fuel spills which could result in a	Standard best practice measures are to be followed throughout the construction phase, with a CEMP produced prior to construction works detailing the practical and necessary measures required during construction to prevent the pollution of the surrounding environment. On-spot visual monitoring under the WFD directive is recommended to assess any visible changes to the waterbody. The Scheme to adhere to mitigation measures outlined in the Habitats Regulations Assessment (HRA).	No - Any impacts to the waterbody are anticipated to be localised and not result in deterioration at the waterbody scale, as such providing embedded mitigation measures are implemented and standard best practice measures are followed, the Scheme would be WFD compliant.

⁸ Potential impacts and associated mitigation measures relating to the Liverpool Bay SPA have been extracted from the Central Rhyl Coastal Defences Environment Statement Volume 1: Main Text, Biodiversity Chapter, Mott MacDonald, 2021.

WFD Quality Element	Potential impacts	Compliance, mitigation and recommendations	Will the Scheme result in deterioration of WFD Quality Element?
	deterioration of the SPA and adversely impact the designated interest features. During construction, the stockpiles of rock for the scour protection (section A to D) will be stored on the beach prior to placement and will be on the intertidal area over a tidal cycle. This has the potential to increase suspended sediment and reduce visibility which has the potential to adversely impact the food source of the overwintering birds. During construction, it is anticipated for artificial lighting to be required, which has the potential to disturb and displace birds using the area closer to shore. During operations, there is a potential for the maintenance works to result in the same impacts as during construction (visual disturbance, noise and vibrations, water quality, turbidity), however it would depend on the scale of the works required. Bathing Waters: There is potential for suspended sediments resulting from construction activities to affect the water quality of the Bathing Waters in the immediate vicinity of the Scheme, although the water quality of the overall North Wales waterbody would not be affected.		

Table 5.2: Potential impacts on WFD status of the Clwyd Transitional Waterbody

WFD Quality Element	Potential impacts	Compliance, mitigation and recommendations	Will the Scheme result in deterioration of WFD Quality Element?
Protected Areas: Liverpool Bay SPA, Rhyl East Bathing Waters, Marine Lake Bathing Waters, and Rhyl Bathing Waters	Liverpool Bay SPA: - Designated for the wintering and breeding bird assemblages it supports. - Visual disturbance: During construction, the works have the potential to visually disturb birds due to the increase in human activity on the shoreline. - Noise and Vibration: During construction, there will be an increase in noise and vibration which has the potential to disturb or displace foraging birds, especially during winter months. - During construction, there is a potential risk of water quality deterioration from oil or fuel spills which could result in a deterioration of the SPA and adversely impact the designated interest features. - During construction, the stockpiles of rock for the scour protection (sections A to D) will be stored on the beach prior to placement and will be on the intertidal area over a tidal cycle. This has the potential to increase suspended sediment and reduce visibility which has the potential to adversely impact the food source of the overwintering birds. - During construction, it is anticipated for artificial lighting to be required, which has the potential to disturb and displace birds using the area closer to shore. - During operations, there is a potential for the maintenance works to result in the same impacts as during construction (visual disturbance, noise and vibrations, water quality, turbidity), however it would depend on the scale of the works required. Bathing Waters: - There is potential for suspended sediments resulting from construction activities to affect the water quality of the Bathing Waters in the immediate vicinity of the Scheme, although the water quality of the overall North Wales waterbody would not be affected.	- Standard best practice measures are to be followed throughout the construction phase, with a CEMP produced prior to construction works detailing the practical and necessary measures required during construction to prevent the pollution of the surrounding environment. On-spot visual monitoring is recommended to assess any visible changes to the waterbody. - The Scheme to adhere to mitigation measures outlined in the Habitats Regulations Assessment (HRA).	No - Any impacts to the waterbody are anticipated to be localised and not result in deterioration at the waterbody scale, as such providing embedded mitigation measures are implemented and standard best practice measures are followed, the Scheme would be WFD compliant.

5.3 In-combination impact assessment

The following coastal improvement projects were identified as having potential for in-combination effects:

- East Rhyl Coastal Defences Scheme;
- Llanddulas to Kinmel Bay Coastal Defence Improvements (Conwy County);
- Central Prestatyn Coastal Defence Improvements;
- Colwyn Bay Waterfront Project (Old Colwyn / Phase 2b);
- Penrhyn Bay Coastal Defences; and,
- Llandudno Coastal Defences.

It is anticipated for all the projects to overlap, however, the only projects which have progressed to planning application or construction are the East Rhyl Coastal Defences Scheme and the Colwyn Bay Waterfront Project.

All coastal defence projects need to be considered in-combination as the cumulative effects of the projects commencing within the same timescale have the potential to change the hydromorphology of the waterbody and result in a deterioration of the WFD quality of the waterbody.

Providing mitigation measures are adhered to, and water quality does not deteriorate at a local level, it is not anticipated for there to be a cumulative impact on the water quality of the waterbody as a whole.

6 Conclusions and Recommendations

6.1 Assessment outcomes

6.1.1 Stage 1: WFD Screening

The Scheme's proposed activities are not listed within Appendix A2.2 of the NRW Guidance, indicating a potential risk and therefore it is considered all of the proposed activities have been subject to further assessment at Stage 3.

The following proposed activities **may cause deterioration or prevent a waterbody from meeting its objectives**, as such, these activities will be screened-in and assessed further:

- Construction Works:
 - Construction of rock scour protection and concrete repairs;
 - Construction of new concrete revetment and associated beach access points;
 - Extension of outfalls and protection works to existing outfalls; and,
 - Construction of raised promenade and associated retaining structures.
- Maintenance / Operational:
 - Inspection, maintenance and repair of coastal defence structures;
 - Inspection, maintenance and repair of accesses, drainage, highways, lighting and other minor assets;
 - Management of wind-blown sand; and,
 - Beach management.

6.1.2 Stage 2: WFD Scoping

To conclude the Scoping Assessment, there is a potential for the Scheme to impact the ability of either North Wales Coastal Waterbody (GB64101165000) or the Clwyd Transitional Waterbody (GB541006608000) to achieve its objectives.

Table 6.1: summaries the waterbodies identified to be scoped-in and assessed further in the scoping assessment.

Table 6.1: Screened-in Waterbody Summary

Waterbody name	Waterbody ID	Reason for scoping-in	Overall status
Coastal Waterbodies			
North Wales	GB641011650000	The Scheme is within this waterbody. The purpose of the Scheme is to change the morphology of the area to prevent the risk of flooding, as such there is a potential for the Scheme to impact the waterbodies objectives during construction.	Moderate
Transitional Waterbodies			
Clwyd	GB541006608000	The Scheme is entirely downstream of this waterbody but is within close proximity to potentially impact the waterbodies objectives during construction.	Moderate

Impacts on the Protected Areas within or in close proximity of the Scheme, either during construction or operation, cannot be ruled out of the screening assessment (with the exception of the NVZ which has been scoped-out.). Therefore, these sites have been considered further in the Stage 3: Detailed Assessment.

The WFD Elements considered further in the Stage 3: Detailed Assessment included:

- North Wales Coastal Waterbody:
 - Hydromorphology: Development for Coastal Protection;
 - Priority Habitats and Species: Higher sensitivity habitats within 500m of the Scheme: Mussel Beds;
 - Water Quality: Phytoplankton status of Moderate; and,
 - Protected Areas: Liverpool Bay SPA, Rhyl East Bathing Waters, Marine Lake Bathing Waters, and Rhyl Bathing Waters.
- Clwyd Transitional Waterbody
 - Protected Areas: Liverpool Bay SPA, Rhyl East Bathing Waters, Marine Lake Bathing Waters, and Rhyl Bathing Waters; and.

6.1.3 Stage 3: Detailed compliance assessment

The Stage 3 assessment considered the potential impacts of the Scheme activities on the WFD quality elements, identified ways to avoid or minimise impacts, and concluded if the activity may prevent any WFD quality element within any WFD water body achieving good status/potential or may cause deterioration.

The assessment found that given:

- The mitigation already incorporated into the Scheme; and,
- The relatively small scale of works in the context of the WFD waterbodies as a whole;

any impacts on the WFD waterbody were considered to be localised and temporary, and not considered to cause deterioration of the WFD waterbody status.

6.2 Conclusions

This WFD Assessment has found that, when considering the mitigation already proposed, the Scheme is very unlikely to affect the WFD status or cause any deterioration of the WFD quality elements for the North Wales Coastal Waterbody or Clwyd Transitional Waterbody.

A. Scheme Extent



Key to Symbols

Scheme red line boundary

Notes

1. This drawing is intended only to be used to support the Environmental Impact Assessment for the proposed Central Rhyl Coastal Defences Scheme, and it should not be used for any other purpose. It presents the red line boundary for the Central Rhyl Coastal Defences Scheme.

2. Contains OS data © Crown Copyright and database right 2020
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C02	03/09/21	SL	Accepted for EIA	CW	NMP
P03	03/08/21	SA	Updated for ES review and comment	CW	NP
C01	02/02/21	SA	Accepted for EIA scoping	CW	NP
P02	18/12/20	SA	EIA Scoping for acceptance	NS	NP
P01	27/11/20	SA	EIA Scoping for review and comment	CL	NMP
Rev	Date	Drawn	Description	Ch'k'd	App'd

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County Council

Balfour Beatty

Title

Central Rhyl Coastal Defences
Red Line Boundary

Designed	N Spofforth	NS	Eng. Check	C Williams	CW
Drawn	S Li	SL	Coordination	N Spofforth	NS
GIS Check	S Anstice	SA	Approved	N M Price	NMP
Scale at A3	Status	Rev	Security		
1:8,000	A4	C02	STD		

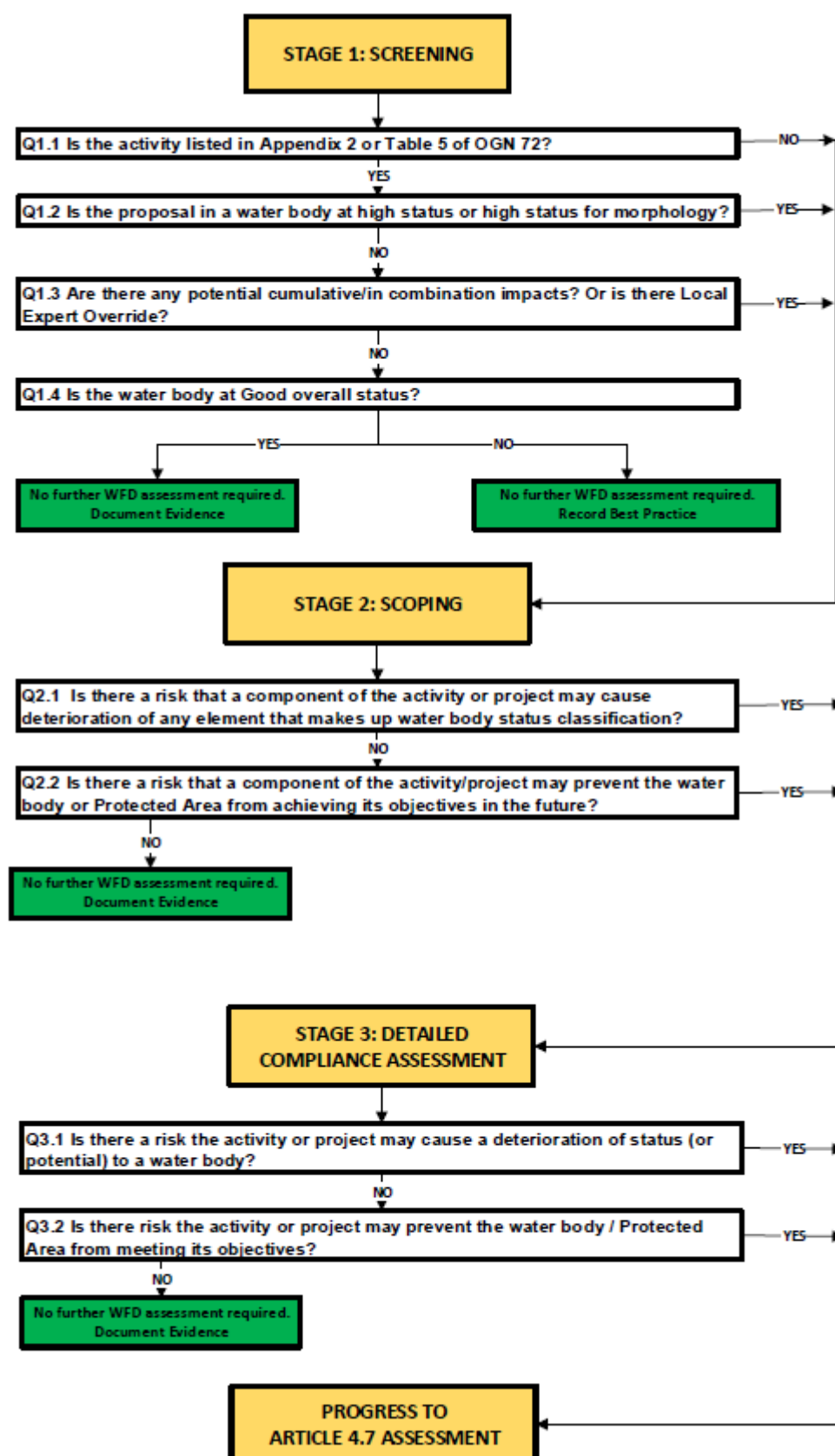


Drawing Number

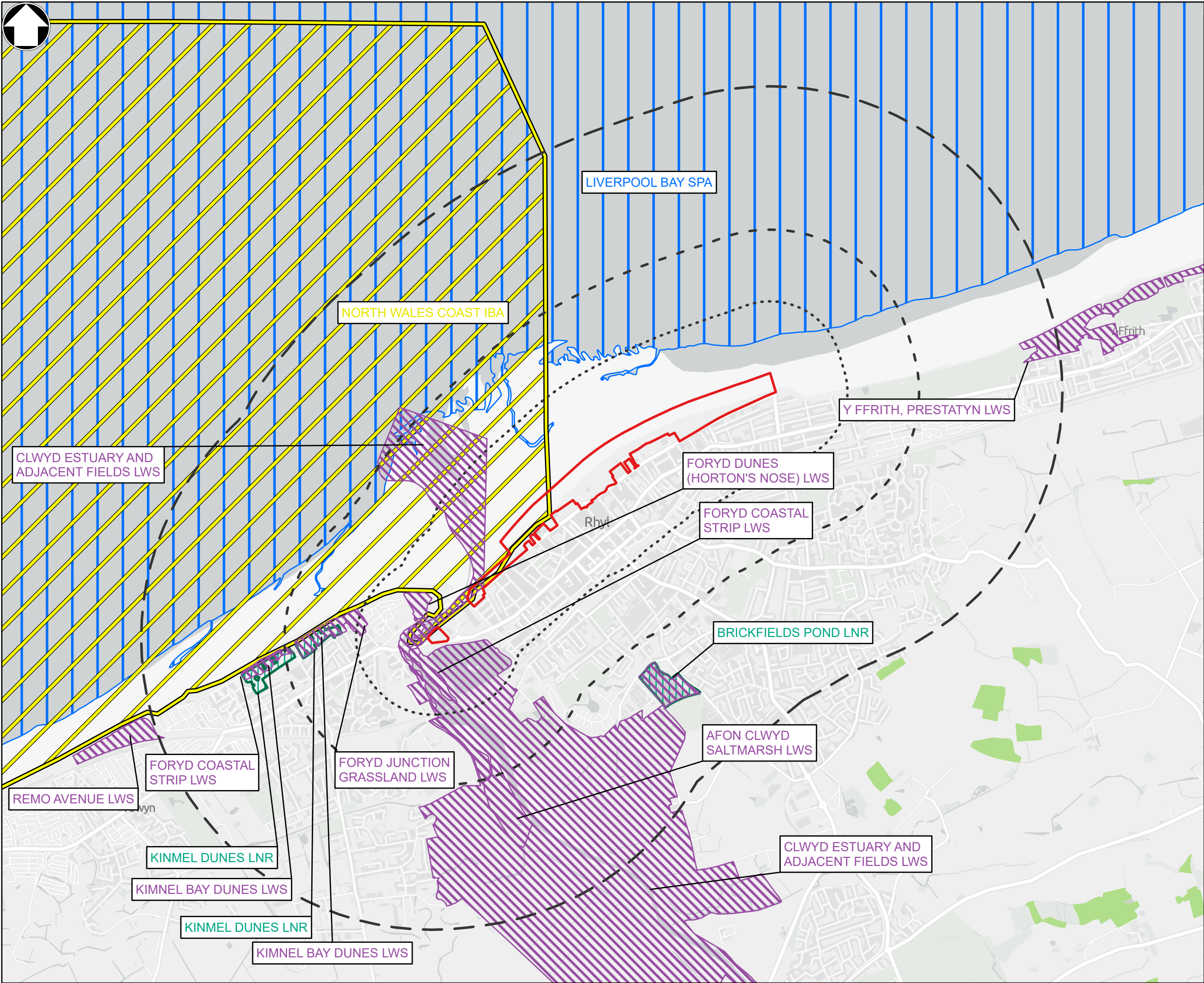
CR-MMD-00-00-DR-EN-3006

B. WFD Compliance Assessment Process Flowchart

Figure 1: WFD Compliance Assessment Process Flowchart



C. Protected Area Map



A map of the St Asaph area in North Wales. Two study sites are highlighted: Site 1 is marked with a red box and Site 2 with a black box. The map shows the coastline to the north, with Rhyl and Prestatyn to the north of the study area. Rhuddlan and Albergele are to the west, and St Asaph and Caerw are to the south. The map also shows various roads and green spaces.

- Scheme red line boundary
- Scheme red line boundary buffer (500m)
- Scheme red line boundary buffer (1km)
- Scheme red line boundary buffer (2km)
- Local Wildlife Sites (LWS)
- Important Bird Areas (IBA)
- Special Protection Areas (SPA)
- Local Nature Reserves (LNR)
- Ancient Woodland

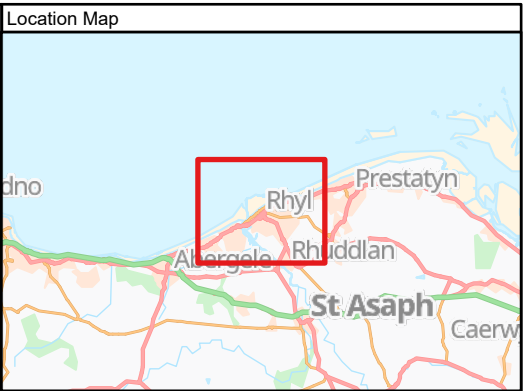
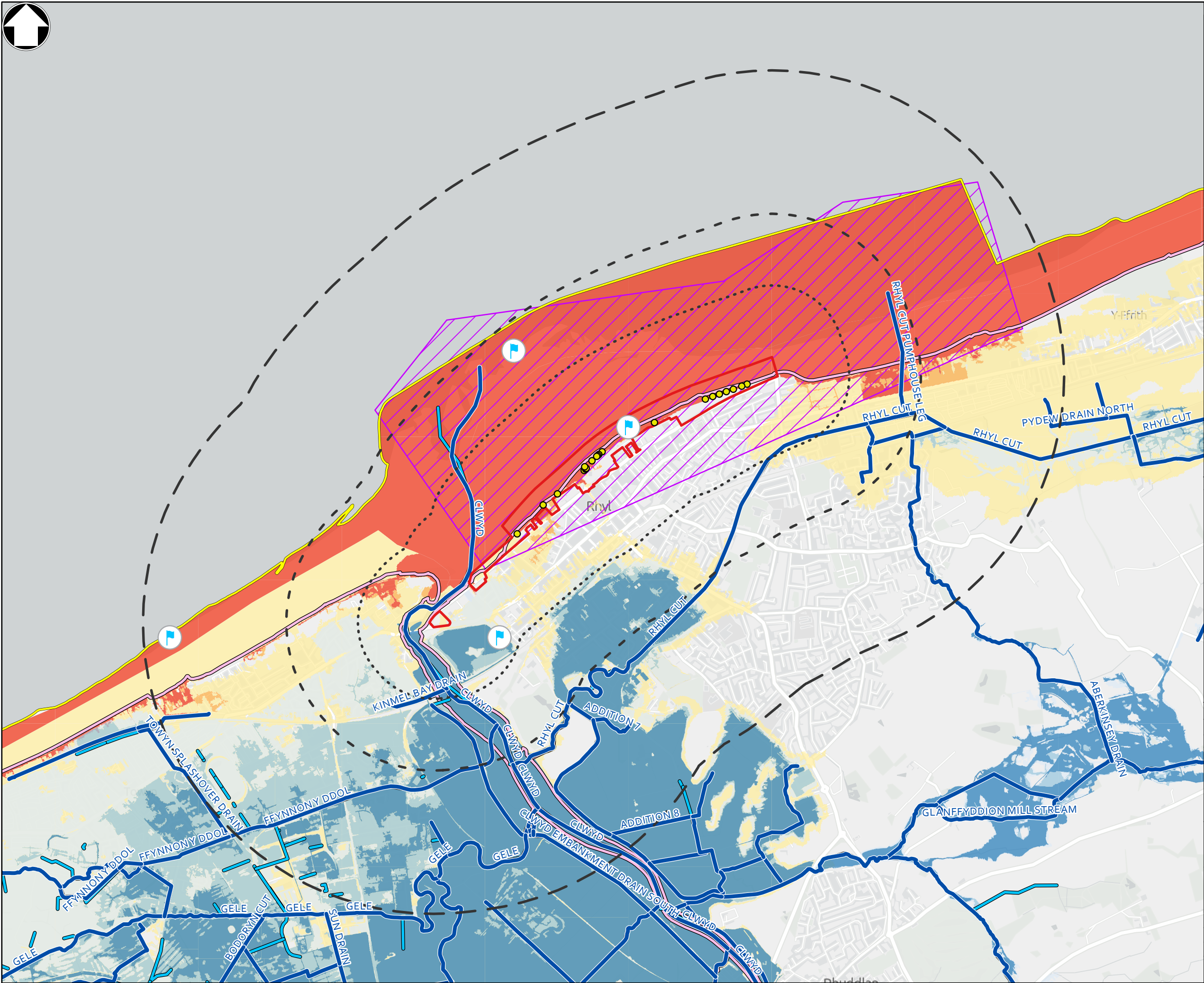
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Title Central Rhyl Coastal Defences
Statutory and Non-Statutory Designated Sites within 2km
of the Scheme
Page 1 of 2

Drawing Number
CR-MMD-00-00-DR-EN-3035



Key to Symbols

Scheme red line boundary	Sensitive areas - Bathing Waters
500m buffer of Scheme extent	Mean low water mark
1km buffer of Scheme extent	Mean high water mark
2km buffer of Scheme extent	Flood risk from rivers
Existing outfalls	High
Bathing Water monitoring point	Medium
Main rivers	Low
Other watercourses	Flood risk from sea
	High
	Medium
	Low

Notes

1. This drawing is intended only to be used to support the Environmental Impact Assessment for the proposed Central Rhyl Coastal Defences Scheme, and it should not be used for any other purpose. It presents the hydrological, coastal and Water Framework Directive (WFD) constraints only.
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6. Outfall locations are indicative locations, hand-drawn based on drawing PMS20222-03 on 07/06/2021. Should be confirmed prior to any works.
7. The Point of Ayr is 10.5km away from the Scheme red line boundary.

C01	03/09/21	SL	Accepted for EIA	CW	NMP
P01	03/08/21	SL	For Review and Comment	CW	NP
Rev	Date	Drawn	Description	Ch'k'd	App'd

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Client

Title					
Central Rhyl Coastal Defences Hydrological, Coastal and WFD Constraints					
Designed	V Tonks	VD	Eng Check	C Williams	CW
Drawn	S Li	SL	Coordination	N Spofforth	NS
GIS Check	S Anstice	SA	Approved	N M Price	NMP
Scale at A3		Status	Rev	Security	
1:25,000		A4	C01	STD	
Drawing Number					
CR-MMD-00-00-DR-EN-3038					



