MOTT MACDONALD

Colwyn Bay Waterfront Project Phase 2b Environmental Statement

Volume 2: Technical Appendices
Technical Appendix 9 - Biodiversity

September 2021

Mott MacDonald
Mott MacDonald House
5 Woodland Road West
Colwyn Bay LL29 7DH
United Kingdom

T +44 (0)1492 534601
mottmac.com

Environment Roads & Facilities
Conwy County Borough Council
Mochdre Council Offices

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Appendix 9.1 – Habitats Regulations Assessment

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Report to inform a Habitats Regulations Assessment (HRA)

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Executive summary

Mott MacDonald Ltd has been commissioned by Conwy County Borough Council (CCBC) to complete a Habitats Regulations Assessment (HRA) relating to the Colwyn Bay Waterfront Project Phase 2b Scheme, Conwy, North Wales (hereafter referred to as the 'Scheme'), in relation to the potential effects upon a European Protected Site, as required by Regulation 63(1) of the Conservation of Habitats and Species Regulations 2017 (as amended).

The Scheme involves repairs to existing sea walls and groynes, as well as beach recharge and improvements to promenades and public spaces. The Scheme is immediately adjacent to the Liverpool Bay Special Protection Area (SPA), however is not directly connected to or necessary for the management of the site. The Menai Strait and Conwy Bay Special Area of Conservation (SAC) also discussed, is located 3.5km from the Scheme.

The Scheme is part of a larger, phased project known as the Colwyn Bay Waterfront Project. Several phases have already been completed, with the Phase 3 Old Colwyn Coastal Defence and Active Travel currently being constructed and anticipated to be complete in 2023, therefore overlapping or running concurrently with the Scheme.

Stage 1 Screening identified five potential likely significant effects: water pollution, changes in turbidity, noise and vibration disturbance, visual disturbance, and artificial light disturbance. No likely significant effect has been identified for Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC, alone or In-combination.

The Scheme has the potential to result in in-combination effects to the Liverpool Bay SPA with seven further projects that are expected to be undertaken concurrently with the proposed Scheme.

A Stage 2 Appropriate Assessment has been undertaken for the Liverpool Bay SPA. By implementing reduction measures (mitigations), which primarily related to avoiding the wintering bird season, the Scheme is considered to have no adverse effect on the integrity of the SPA.

1 Introduction

1.1 Background and Site location

Mott MacDonald Ltd has been commissioned by Conwy County Borough Council (CCBC) to complete a Habitats Regulations Assessment (HRA) relating to the Colwyn Bay Waterfront Project Phase 2b Scheme, Conwy, North Wales (hereafter referred to as the 'Scheme', Figure 1.1).

Figure 1.1: Location of the Scheme

Source: Adapted from drawing 100374-MMD-00-XX-DR-Z-0001

The Scheme is located in the western area of Colwyn Bay and national grid references for the western and eastern boundaries of the Scheme are SH84248052 and SH85717903 respectively.

The Scheme aims to improve the existing coastal defences to provide increased coastal flood and erosion protection to people, property and tourism infrastructure in Colwyn Bay and Rhôs-on-Sea along with supporting local regeneration and achieving wider community benefits.

1.2 Colwyn Bay Waterfront Project

The Scheme is part of the Colwyn Bay Waterfront Project introduced in 2007 by CCBC, which sought to address both the deteriorating coastal defences as well as public facilities to spark

regeneration of the area. A summary of the works completed at each stage to date is provided in Table 1.1.

Table 1.1: Colwyn Bay Waterfront Project summary

Phase	Stage	Description	Completion date
1	General	Phase 1 of the scheme was carried out in three stages covering approximately 35,000m^2. The site was located within the central section of the frontage either side of Victoria Pier from the section of seafront in the vicinity of Marine Road to the west, to the section of seafront parallel to the J22 eastbound slip road of the A55 Expressway to the east.	October 2014
1	a	Phase 1a of the scheme encompassed engineering works and environmental improvements. The engineering works comprised a 150m rock groyne structure perpendicular to the shoreline, with a short length of linear rock revetment to the east of the groyne, along with the construction of a sheet piled wall. A short section of concrete stepped revetment was also constructed along the western edge of the promenade. Existing slipway access at this location was raised and extended to follow the design of the new structures. The environmental works comprised the construction of Porth Eirias, a new multi-use water sports building, and landscaping works.	Engineering works – March 2012 Environmental works – April 2013
1	b	The coastal defence works primarily comprised beach recharge to the west of Porth Eirias, to bring beach levels up to the level of the existing promenade (approximately 5.00m above ordnance datum (AOD)) but below the existing seawall crest (at approximately 6.15m AOD). Beach recharge was also undertaken between Cayley Promenade and Eirias Park, sourced from Liverpool Bay. Promenade enhancement was carried out to the west of the completed Porth Eirias Phase 1a works up to the pier area and extending below the Network Rail over-bridge as far as the interface with the train station. Enhancement works included improvements to the promenade consisting of; stepped revetment structures, 'headland' structures, access ramp, cycle ramp, car parking, promenade raising, secondary sea defence wall, streetlighting, street furniture and new town centre link works.	Coastal defence works – May 2013 Promenade enhancement works – October 2014
1	c	Coastal defences consisting of beach recharge (totalling 220,000m^3 dredged beach material) and associated infrastructure works, including extending surface water outfalls, repairs to the existing seawall and removal and replacement of rock armour. Works were completed in parallel with the Phase 1b promenade enhancements.	Coastal defence works – October 2014
2/1	*a/d*	*Note: Some reports refer to 1d, while others refer to 2a, these phases are one and the same.* Regeneration of two areas of coastline (Areas A and B) located between Victoria Pier and Cayley Embankment. Area A extended approximately 430m westwards from Victoria Pier to Princess Court apartments. Works comprised improved recreational opportunities and enhanced coastal defences across the site. This involved widening and raising the existing promenade and highway	September 2017

Phase	Stage	Description	Completion date
		by constructing a new seawall approximately 7m seaward of the existing seawall, with three new headlands. Area B extended approximately 420m westwards from the Princess Court apartments to Rydal boat store near Cayley Embankment. Works included improved slipway access, beachfront access compliant with the Equalities Act 2010, car parking changes, seating, planting, railings, street furniture and lighting changes.	
Splashpoint		This scheme comprises the construction of a short section of 30m deep rock revetment against the seawall at the location identified as being at highest risk of imminent collapse – the easternmost section of the promenade (where a revetment is currently absent) known as 'Splashpoint'.	Ongoing (anticipated to be completed prior to construction of Phase 2 commencing)
3 (Old Colwyn Coastal Defence and Active Travel Scheme)		This phase comprises the construction of a 32m deep rock revetment along the base of the seawall from Porth Eirias to join with the Splashpoint Project to the east with associated outfall extensions and new pedestrian accesses to the beach. It also includes active travel improvements to include new cycleway layouts, improved pedestrian access areas, improved lighting, new handrailing and improved signage along with other promenade improvements.	Anticipated 2023
2	b	Current Scheme	Anticipated May 2023

Source: Adapted from Project Appraisal Review and Update Report, CCBC, 2018

1.3 Proposed scope of coastal and promenade works

The proposed scope of the coastal and promenade works has been set out in the following sections and associated scheme design drawings have been included within Appendix A.

1.3.1 Coastal works

1.3.1.1 Sea wall repairs

Minor repairs (e.g. grouting, re-pointing, coping repairs, filling of voids) to the existing sea wall from Rydal Boat store boundary with the Phase 2a area to the southern boundary of Rhôs-on-Sea harbour. Works would be completed both from the promenade and from the intertidal area (depending on the repair needed).

1.3.1.2 Terminal groyne works

The terminal groyne adjacent to Rhôs-on-Sea harbour would be raised by approximately 1m along its length and an additional arm will be added. Construction of this would re-use 9-10,000m^3 existing rock revetment currently located against the sea wall across the Phase 2b area and present within existing groynes (which would otherwise be redundant following beach recharge activities). This is needed to prevent the beach recharge activities causing siltation of the Rhôs-on-Sea Harbour.

1.3.1.3 Outfall extensions and groynes

A total of six Welsh Water surface water outfalls would be buried by the beach recharge. It is currently understood that three outfalls would be extended by a new section of pipe, encased by concrete for protection.

The three remaining outfalls would be anticipated to be either diverted within the promenade to one of the retained extended outfalls or protected by a gabion basket to allow continued flow beneath the new beach surface level.

1.3.1.4 Beach recharge

Beach recharge activities would involve the importation and placement of approximately 1,000,000t (~666,000m^3) of dredged sand material between the Rhôs-on-Sea terminal groyne to the west round to the existing slipway adjacent to the western junction of Cayley Promenade with Rhôs Promenade to the east to bring levels up to match the design profile of the Phase 1 works (5mAOD). Recharge would be then tapered off from this point eastwards to tie in with levels in the vicinity of the Horizon Shine Kiosk.

Dredged sand would be transported via a floating and sinker pipeline, which would be constructed and deconstructed on Pensarn beach, which is located eastwards along the coast between Colwyn Bay and Rhyl.

In addition, the Scheme would also appropriately include for the 'topping-up' of sand levels between the Horizon Shine Kiosk and the new truncated pier location.

The design profile of the new beach would comprise an upper berm of 20m width and 1 in 40 slope to seaward, which would abut the existing sea wall at a level of +5.0m AOD. From the seaward edge of the berm, the beach would be placed at a gradient of approximately 1 in 30 until it meets the existing beach at a level typically between -2.0 and -3.0 AOD.

Beach management activities between the pier and Porth Eirias would carry on as usual under the existing Marine Licence for this purpose.

1.3.2 Promenade works

The promenade improvement works are currently anticipated to comprise:

- A 2.2m wide pedestrian-only zone;
- A 4m wide shared surface with health markers at 50m intervals;
- Designated picnic / seating areas;
- Activity zones;
- "Rhôs" feature letters and artwork;
- Pedestrian links across the highway & promenade;
- Intermediate links across promenade & shared surface;
- Traffic re-routing;
- New surface finishes;
- Landscaping (including appropriate planting / soft landscaping);
- Streetlighting; and
- Street furniture / features.

1.3.3 Future maintenance

Following discussion with CCBC on the current maintenance of a similar scheme, it is currently anticipated that future maintenance action would comprise:

- Reactive maintenance and repair of structures, groynes, and steps as identified following routine inspections;
- Routine maintenance and repair of promenade including pavement, drainage system, and vegetation management of soft landscaped areas;

- Cleaning and maintenance of slipways, with a suitable inspection regime;
- Maintenance of landscape features such as benches, guards, and handrails;
- Beach management – redistribution of sand on up to an annual basis, depending on weather conditions; and
- Monitoring of beach levels across the Scheme area.

1.3.4 Proposed works programme

The programme is currently anticipated to be:

- Detailed design of the Scheme completed by Summer 2021;
- Mobilisation and starting works by end of March 2022; and
- A continuous construction period of approximately 14 months will be split into phases in the following order:
  - Repairs to sea wall, modifications to terminal rock groyne and extension of outfalls;
  - Beach recharge; and
  - Promenade works.

2 Habitat Regulations Assessment process

The requirement for a Habitats Regulations Assessment (HRA) arises in the UK under the Conservation of Habitats and Species Regulations 2017 (as amended) (hereafter referred to as 'the Habitats Regulations'). The 2019 amendments to the Habitats Regulations transferred Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) site previously within the Natura 2000 network into a UK National Network of protected sites (hereafter referred to as 'designated sites'). Ramsar sites are not part of the UK National Network.

Under Regulation 63 of the Habitats Regulations where a plan or project is not directly connected with, or necessary to, the management of a designated site which may give rise to significant effects upon the site, a competent authority must make an assessment of the potential effects on the designated site and its conservation objectives, prior to consent for the plan or project being granted. The HRA process comprises four stages:

- **Stage 1 Screening for Likely Significant Effects (LSE)** Identification of designated sites, pathways to receptors and what features of the designated site(s) in question that are within a zone of influence of the proposed plan or project. This part of the process initially identifies the likely effects upon a designated site of a plan or project, either alone or in combination with other plans or projects and considers whether these effects are likely to be significant.
- **Stage 2 Appropriate Assessment (AA)** The detailed consideration of the effects arising from the plan or project upon the designated site(s), either alone or in combination with other plans or projects, with respect to the site's conservation objectives and its structure and function. This is to determine whether there will be any adverse effects on the integrity of the site.
- **Stage 3 Assessment of Alternative Solutions** The process which examines alternative ways of achieving the objectives of the plan or project that avoid adverse effects on the integrity of the site. This stage may also identify alternatives to achieving the project objectives that have greater or lesser adverse effects on the integrity of the site.
- **Stage 4 Imperative Reasons of Overriding Public Interest (IROPI)** Assessment where no alternative solutions exist and where adverse effects cannot be avoided – an assessment of whether the development is necessary for IROPI and, if so, of the compensatory measures needed to maintain the overall coherence of the National Network.

The HRA, and specifically the detailed AA stage, supports a decision by a 'Competent Authority' as to whether a proposed plan or project would have an adverse effect on the "integrity" of a designated site; ODPM (2005)[1] takes this to mean "the coherence of the site's 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 the species for which it was classified".

The decision is based upon the implications of a project on the conservation objectives of the site. These objectives set out the physical, chemical, and biological thresholds, and limits of activity and disturbance, which must be met to maintain integrity. An adverse effect on integrity is likely to be one that results in a deterioration of conservation status with regard to the qualifying feature(s) for which it was designated.

The assessment of effects on designated sites applies a precautionary principle, if any doubt exists as to the effect of projects (considering any necessary mitigation measures), then 'no adverse effect on integrity' cannot be concluded. In this situation alternative solutions must be

[1] Office of the Deputy Prime Minister (ODPM) (2005). Planning Policy Statement 9: Biodiversity and Geological Conservation. ISBN 0-11-75394-6.

sought. Where feasible alternatives do not exist then the project can only proceed on the basis of imperative reasons of over-riding public interest (IROPI). This must be agreed by the Secretary of State and compensatory measures to offset damage/loss and to maintain the overall coherence of the National Network must be secured and ecologically functional in advance of the damage.

3 Methodology

All available information about the Scheme was gathered in order to assess whether it is considered is likely to have any significant effects on any features a European site or have an adverse effect on the integrity of that site.

3.1 Assessing potential impacts

The aim of the HRA Screening process is to determine whether the Scheme is likely to have a significant effect on any features of a designated site and, therefore, if an Appropriate Assessment is required. Its interpretation is well established in law and guidance and embraces the precautionary principle. Whether the Scheme has the potential to have a significant effect on a designated site depends on the occurrence of:

- Any potential impact pathways;
- Land take and habitat removal for the works;
- A risk of altering the hydrodynamic regime;
- A risk of an increase in air, noise, and light pollution;
- A risk of a reduction in water quality; and
- Physical disturbance to international designated sites and/or their designated interest features.

Determination of whether there will be an impact from the Scheme on a designated site will be determined using professional judgement using the best readily available information. This information can include evidence from previous similar projects that have impacted designated sites and any ecological survey information gathered.

3.2 Identification of designated sites to be included

The proposed repair works have the potential to impact on ecological features such as habitats and/or species beyond the confines of the working area itself. A zone of influence (ZoI) has been used to define the study area for this screening assessment and the potential impacts on designated sites are defined as:

- Areas where there is physical disturbance to international designated sites and/or their designated interest features;
- Areas where there will be land take and habitat removal for the works;
- Areas where there is a risk of altering the hydrodynamic regime;
- Areas where there is a risk of an increase in air, noise, and light pollution; and
- Areas where there is a risk of a reduction in water quality.

A search was undertaken for all European sites within 2km of the Scheme in line with DMRB LA 115 guidance[2], which has been applied to the Scheme as a large, linear project similar to the highways projects the guidance is produced for. A precautionary distance of 2km is considered for all identified European sites for the effects of visual disturbance and increases in noise.

Sites hydrologically connected to the Scheme could be affected by changes to water quality from the Scheme in the absence of appropriate mitigation measures. Searches were therefore undertaken for designated sites where the Scheme crosses, is adjacent to, upstream of, or

[2] LA 115 - Habitats Regulations assessment - DMRB (standardsforhighways.co.uk) [Accessed May 2021]

downstream of and watercourses designated in part or wholly as a European site following guidance in DMRB LA 115.

Additionally, sites designated for mobile species such as bats, birds, and marine mammals, could be affected the Scheme if those species for which the sites are designated for travel beyond the boundaries of the site and within the zone of influence. A further search for European sites where bats are a primary qualifying feature within 30km of the Site, and where marine mammals are a qualifying feature within 10km of the Site, was therefore undertaken in line with DMRB LA 115.

The 2km, 10km and 30km search areas have been applied to the Site. The approach to this HRA is consistent with DMRB guidance.

3.3 Information gathering on European Sites

Information on each European site, including the qualifying features, the designated site citation (including condition assessment information for Sites of Special Scientific Interest (SSSI)), the Natura 2000 Standard Data Form (Information Sheet on Ramsar Wetlands), conservation objectives and Site Improvement Plans were obtained from the Natural Resources Wales website[3] and the Joint Nature Conservation Committee (JNCC) website[4].

3.4 In-combination assessment methodology

In-combination effects have been determined following a review of likely impacts resulting from incremental changes caused by other present or foreseeable plans or projects together with the Scheme. This includes projects which have the potential to impact on the same designated sites as the Scheme, using the screening criteria outlined in Section 3.1.

This assessment includes development projects with valid planning permissions (including those under consideration by the planning authority) within Conwy County Borough Council[5] and the neighbouring authority, Denbighshire County Council[6]. Consideration of Local Plan commitments has also been included within the in-combination effects, together with any Nationally Significant Infrastructure Projects (NSIPs).

3.5 Assessing Likelihood of Significant Effects

Consideration of elements of the Scheme that could potentially impact European sites, the qualifying features of those sites, the conservation status of the qualifying interests, and the vulnerability of the conservation objectives of the European sites are included in the screening process. Stage 1 Screening must be undertaken in all cases.

[3] Natural Resources Wales / Find protected areas of land and sea [Accessed May 2021]

[4] JNCC - Adviser to Government on Nature Conservation [Accessed May 2021]

[5] https://www.conwy.gov.uk/en/Resident/Planning-Building-Control-and-Conservation/Planning-Applications/Planning.aspx [Accessed May 2021]

[6] Search and comment on Planning applications | Denbighshire County Council [Accessed May 2021]

4 Screening

4.1 Identification of sites

The only internationally designated site within 2km is Bae Lerpwl/Liverpool Bay SPA, located immediately north of the Scheme. No additional SACs designated for bats or marine mammals have been identified within 10km. In their response to the EIA Scoping NRW suggested that the Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC should be included in the HRA. This SAC is located approximately 3.5km to the west of the Scheme and is designated for its Annex I habitats.

The Dee Estuary SAC, SPA and Ramsar is located approximately 17km east of the Scheme, along with a known little tern (*Sterna albifrons*) colony located on Gronant Beach, Prestatyn approximately 16km east of the Scheme. As set out in Section 3 and based on the project scope and lack of potential impact pathways, the Dee Estuary SAC, SPA and Ramsar, and associated little tern breeding colony have been scoped out of this assessment.

4.2 Assessment of impact pathways

Potential impact pathways and sources of disturbance from construction include:

- Pollution event – resulting from an oil spill or other pollution sources (from machinery) which could damage habitats (reducing prey availability) as well as cause harm to birds directly;
- Noise and vibration disturbance – resulting from machinery, vehicle movements and personnel. Any such sources of disturbance close to the shoreline could disturb or displace birds using these areas to forage, whilst disturbance out at sea from the dredger associated with recharge works could disrupt marine species, notably any larger rafts of birds (if present outside October to March);
- Visual disturbance – increased human activity and machinery along the promenade and intertidal area, as well as vessels in the nearshore area which could disturb and displace birds foraging closer to shore;
- Artificial lighting disturbance – using vehicles on the foreshore and working vessels in nearshore waters will increase lighting above normal levels during night working hours. This could disturb and displace birds using areas closer to shore. Further lighting disturbance could result from the dredger associated with the beach recharge element and affect larger rafts of birds out at sea (if present outside October to March);
- Changes in turbidity – it is possible for sediment to be disturbed and released through construction activities and during the beach recharge works. This could adversely impact submerged seaweeds/plants and filter feeding organisms which provide prey for birds, as well as affecting diving bird species using sight to feed/hunt close to the coast; and
- Introduction and spread of invasive and non-native species (INNS).

Disturbance can affect birds directly, by displacing them away from key foraging grounds and causing swimming or flight flee responses. Fleeing from a disturbance event can also indirectly reduce food availability by displacing birds, directing them to less favourable habitats which can subsequently affect energy budgets and survival rates, thus impacting the overall population numbers.

Displacement from preferred feeding areas may have an adverse effect by being energetically expensive to individuals, particularly diving birds, where the feeding activity is physically

depleting. Birds displaced from preferred feeding areas may need to swim against currents in order to stay in an area where prey species are present[7].

The Waterbird Disturbance Mitigation Toolkit[8] has been utilised to assess the impact of the Scheme construction on the birds present within the Scheme area with regards to noise and visual disturbance.

As set out above in respect of operational and decommissioning stages of the project, the operational stage is considered to be an improvement to the baseline in terms of potential disturbance to birds (with less maintenance required and therefore fewer emergency repairs), whilst no decommissioning is anticipated. As such, no potential impact pathways from these phases have been identified.

4.3 Site citation details and conservation status

Table 4.1 documents the key features, management, and vision of the SPA and SAC.

Table 4.1: Liverpool Bay SPA and Menai Strait and Conwy Bay SAC – Citation Details and Conservation Status

National Site Network Site(s)	Bae Lerpwl/Liverpool Bay SPA	
Distance from the closest part of the project	Immediately adjacent	
Description of the site(s)		
Key Qualifying features		
Annex I habitats or species	Annex I habitats present as a primary reason for selection of this site	Not applicable
	Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site	Not applicable
Annex II habitats or species	Annex II species that are a primary reason for selection of this site	• Red throated diver (*Gavia stellata*) • Little gull (*Larus minutus*) • Common scoter (*Melanitta nigra*) • Little tern (*Sterna albifrons*) • Common tern (*Sterna hirundo*)
	Annex II species present as a qualifying feature, but not a primary	Not applicable

[7] Hawkins, P.A.J., Butler, P.J., Woakes, A.J. & Speakman, J.R. 2000. Estimation of the rate of oxygen consumption of the common eider duck (Somateria mollissima) with some measurements of heart rate during voluntary dives. J. Exp Biol. 203: 2819–2832.

[8] Waterbird Disturbance Mitigation Toolkit, University of Hull, 2013 [Online] Available at: https://tide-toolbox.eu/tidetools/waterbird_disturbance_mitigation_toolkit/ [Accessed October 2020]

National Site Network Site(s)	Bae Lerpwl/Liverpool Bay SPA	
	reason for site selection	
Assemblage qualification	An internationally important assemblage of birds present as a qualifying feature	In the non-breeding season, the site regularly supports at least 69,687 (2004/05 -2010/11) individual waterbirds. The main components of the assemblage include all of the non-breeding qualifying features listed above as well as red breasted merganser (*Mergus serrator*) and great cormorant (*Phalacrocorax carbo*).
Management of the site		
Vision of the site	The stated objectives are to 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 Wild Birds Directive, by maintaining or restoring: • The extent and distribution of the habitats of the qualifying features. • The structure and function of the habitats of the qualifying features. • The supporting processes on which the habitats of the qualifying features rely. • The population of each of the qualifying features. • The distribution of the qualifying features within the site.	
Current status of species or habitats and vulnerabilities		
Site	**Species**	**Status and vulnerabilities**
Bae Lerpwl/ Liverpool Bay	Red-throated diver (wintering)	An increase in numbers wintering in the SPA recorded recently may be the result of i) a proportion of the biogeographic population moving further west from Baltic wintering grounds, ii) a change in survey method i.e. visual aerial to digital aerial where there is greater confidence in the estimate or iii) a combination of the two. Known vulnerabilities including physical loss or damage of supporting habitat, disturbance (from certain sources noise or movement), toxic and non-toxic (turbidity) contamination and biological disturbance. Disturbance was noted to be the highest vulnerability for this species.
	Common scoter (wintering)	The significant change in numbers may be the result of i) a proportion of the biogeographic population moving from Baltic wintering grounds, ii) a change in survey method i.e. visual aerial to digital aerial where there is greater confidence in the estimate or iii) a combination of the two. Known vulnerabilities including physical loss or damage of supporting habitat, disturbance (from certain sources noise or movement), toxic and non-toxic (turbidity) contamination and biological disturbance. Disturbance was noted to be the highest vulnerability for this species.
	Little Gull	Not available
	Little tern	Not available
	Common tern	Not available
	Waterbird assemblage	Common scoter are noted to be the dominant species in this feature and so the current status and vulnerabilities has been taken from this species.
National Site Network Site(s)	**Menai Strait and Conwy Bay (SAC)**	
Distance from the closest part of the project	Approximately 3km to the west of the Scheme	
Description of the site(s)		
Key Qualifying features		

National Site Network Site(s)	Bae Lerpwl/Liverpool Bay SPA	
Annex I habitats or species	Annex I habitats present as a primary reason for selection of this site	**Sandbanks which are slightly covered by sea water all the time** - Menai Strait and Conwy Bay between mainland Wales and Anglesey includes the Four Fathom Banks complex, which is a relatively rare type of subtidal sandbank in Wales, in that it is comparatively large, and is fairly sheltered from wave action but situated in an area of open coast. The sandbanks vary from stable muddy sands in areas that experience weak tidal streams to relatively clean well-sorted and rippled sand in the outer area of the bank where tidal streams are stronger. In very shallow waters, particularly in the inner shore areas, relatively species-rich sandy communities are dominated by polychaetes such as *Spio filicornis*. In some years when numbers of bivalves are high, internationally important flocks of common scoter (*Melanitta nigra*) have been observed to congregate in the area of the Four Fathom Banks complex. **Mudflats and sandflats not covered by seawater at low tide** - The intertidal mudflats and sandflats of the Menai Strait and Conwy Bay on the north Wales coast include Traeth Lafan, the shores of the Menai Strait, and the Foryd estuary. Traeth Lafan is an example of an almost fully marine extensive mud and sandflat that experiences a broad range of wave exposure, providing a range of sediment types with typical associated communities. For example, the shrimps *Haustorius arenarius* and *Bathyporeia sarsi* are found in mobile clean sand, whilst bivalves such as the cockle (*Cerastoderma edule*), the gaper (*Mya arenari)* and Baltic tellin (*Limecola balthica*) are common in more sheltered fine and muddy sand. The sand-mason worm (*Lanice conchilega*) is found in more tide-swept areas. The mixed sediment shores between Beaumaris and Lleiniog are highly productive shores that are rich in animal and plant species. These shores include a nationally important biotope that is rare in the UK. The nationally scarce dwarf eelgrass (*Zostera noltei*) is also found at this site. **Reefs** - The reefs of the Menai Strait and Conwy Bay between mainland Wales and Anglesey include the tidal rapids of the Menai Strait, and limestone reefs along the south-east Anglesey coast and around Puffin Island and the Great and Little Ormes. The environmental conditions of the Menai Strait are unusual. The water is relatively turbid, containing a relatively high level of suspended material, and although the area is largely sheltered from wave action tidal streams are strong, reaching up to 8 knots (4 m s^{-1}) in places during spring tides. As a result, the rocky reefs of the Strait are dominated by a diverse and unusual mixture of animals that feed mainly by filtering their food from the seawater. For example, colonies of sponges, such as the breadcrumb sponge (*Halichondria panicea*), grow to unusually large sizes, with single colonies covering areas of over $1m^2$. The limestone reefs are home to several species that bore into rock, and some limestone specialists are restricted to this relatively rare habitat. Species include the rock-boring sponge (*Cliona celata*), piddocks (*Hiatella arctica*), polychaete worms (*Polydora sp.*), and acorn worms (*Phoronis hippocrepia*).
	Annex I habitats present as a qualifying feature, but not a primary reason for	**Large shallow inlets and Bays** **Submerged or partially submerged sea caves**

National Site Network Site(s)	Bae Lerpwl/Liverpool Bay SPA	
	selection of this site	
Annex II habitats or species	Annex II species that are a primary reason for selection of this site	Not applicable
	Annex II species present as a qualifying feature, but not a primary reason for site selection	Not applicable
Management of the site		
Vision of the site	The long-term vision for the Menai Strait and Conwy Bay SAC is for it to be a healthy, productive and biologically diverse maritime area, supporting resilient marine ecosystems and communities. The intertidal mudflats and sandflats feature should continue to comprise an array of sediment habitats and their associated biological communities, ranging from wave-exposed sands, through to sheltered muds and tide-swept muddy gravels. In many areas, such as at Traeth Lafan and around the mouth of the Conwy Estuary, the feature will comprise a dynamic mosaic of sediment types, with associated communities, whilst other intertidal sediments, such as sheltered areas in the Menai Strait are expected to have more temporal and spatial stability. On the extreme lower shore in the western Menai Strait and Conwy Bay, dynamism is expected between the intertidal mudflat and sandflat and the subtidal sandbank features, depending on the prevailing physical conditions. Intertidal mud and sandflat habitats and communities which are currently impacted by activities such as bait digging and the use of vehicles on the shore, would be expected to improve in quality and become more diverse under appropriate management. As water quality in the area continues to improve, dwarf eelgrass beds are expected to expand their range and distribution within the site. Other habitats and communities associated with this feature are expected to either maintain their condition or improve. While the commercial mussel fisheries continue to operate at the eastern and western ends of the Menai Strait, as well as in the Conwy Estuary, intertidal mud and sandflat feature in these areas will continue to be present in a modified state. There is currently no requirement for restoration of these areas of intertidal mudflat and sandflat. The reef feature should continue to comprise a variety of habitats and their associated biological communities, occurring on hard substrate of different types throughout the site. Substrate types range from limestone and clay habitats, through to areas of tide-swept sublittoral hard substrata, including boulders and bedrock. Some areas of reef feature, such as intertidal boulder habitats are expected to improve in quality and become more diverse under appropriate management. Other areas will be expected to either maintain their condition or improve. The subtidal sandbanks feature should continue to comprise mobile or highly mobile sediment habitats and their associated communities. On the extreme lower shore in the western Menai Strait and Conwy Bay, dynamism is expected between the subtidal sandbank and the intertidal mudflat and sandflat features, depending on the prevailing physical conditions. In addition, sandbanks in Conwy Bay and Red Wharf Bay are expected to continue to be part of the dynamic mosaic of shallow sublittoral coastal sediments within the two bays and may also fluctuate according to prevailing physical conditions.	

National Site Network Site(s)	Bae Lerpwl/Liverpool Bay SPA
	The large shallow bay feature should continue to comprise a variety of sediment and hard substrate habitats and their associated biological communities, subject to a wide range of physical conditions, from the wave-sheltered, tide-swept conditions at the eastern end of the Menai Strait through to the more open coast, wave-exposed conditions in Conwy Bay. The subtidal sediments within the embayment should comprise a dynamic mosaic of sediment types, with associated communities which may display considerable temporal and spatial variation, influenced by prevailing physical conditions. Areas of enriched muddy sand in Red Wharf Bay and Conwy Bay are expected to persist, whilst the large shallow bay is expected to continue to be an important feeding and breeding area for a variety of fish species. Certain habitats and communities within the large shallow bay (many of which are part of other habitat features) are expected to improve in quality and become more diverse under appropriate management. Other areas will be expected to either maintain their condition or improve. The sea caves feature should continue to comprise intertidal and subtidal caves, clefts, crevices and tunnels in the limestone substrate around the Great and Little Ormes and the north-east coast of Anglesey. The health and quality of the five SAC habitat features are inter-related and may also depend on the state of other non-feature marine habitats within the site, as well as structural and functional components of the marine ecosystem. The Menai Strait and Conwy Bay supports a vibrant coastal economy, with a variety of commercial and recreational activities dependent on the area, many of which in turn rely on the long-term health and quality of the marine environment. NRW's vision for the SAC and its features cannot be achieved without the help and co-operation of those who use the maritime area in and around the site. NRW and other stakeholders are currently exploring approaches to achieve this vision, including taking an integrated approach to management of activities in the maritime area.

Source: JNCC[4]

4.4 Ecology baseline

In order to determine the potential species and features of the Liverpool Bay SPA and Menai Strait and Conwy Bay SAC that could be impacted by the works, consideration was given to the area potentially affected, including the habitats present and any baseline information on species distribution and likely use of the area.

4.5 Study area and context

The study area extends for approximately 2.6km comprising intertidal habitats including sandy beach, areas of gravel and mud, biogenic reefs, and groynes, as well as the existing coastal defence structures and promenade. The location and quantity of any construction compounds has not been finalised however, it is likely that these would be located on sections of the promenade in the study area (Figure 1.1). Also included within the study area is Pensarn Beach, where the pipeline required for beach recharge will be constructed and floated along the coast to Colwyn Bay for recharge operations however, the SPA is located 300m north of this area.

4.6 Assessment of bird assemblage

Given the proximity of the Site to Liverpool Bay SPA, in order to understand the local waterbird assemblage present, passage and over-wintering bird surveys of the Site and the adjacent areas were undertaken between November 2019 and April 2021[9]. In addition, Wetland Bird Survey (WeBS) data was sourced from the British Trust for Ornithology (BTO) for the count

[9] Mott MacDonald, August 2021. Colwyn Bay Waterfront Project, Over wintering Bird Survey Report 410895-MMD-N-R-00-XX-1700

sectors covering the area (Colwyn Bay to Rhôs Point and Abergele to Llanddulas) for the most recent five-year period (2014 to 2019).

Liverpool Bay SPA regularly supports more than 1% of the British population of red-throated diver (*Gavia stellata*), 1% of the biogeographical population of common scoter (*Melanitta nigra*) and more than 60,000 waterfowl during the non-breeding season. Within the entire SPA, peaks of common scoter can reach up to 29,000 birds (60% of total population) and up to 1000 (5%) of the UK red-throated diver population during October to March. The SPA is also designated for non-breeding little gull (*Hydrocoloeus minutus*) and breeding common tern (*Sterna hirundo*) and little tern (*Sternula albifrons*). The baseline survey results are therefore summarised below with particular reference to these interest features of the Liverpool Bay SPA.

The surveys have identified a total of 20 bird species within the Scheme area, which is considered moderate species richness based on the size of the area, and species observed were consistent throughout all completed surveys and are considered typical of the habitats present.

The most notable areas for wintering bird species are the intertidal, breakwater and sea areas. The breakwater area appeared to support a greater number of roosting species, particularly during high tide. However, the number of birds in this area is not considered significant.

For species which are features of interest of the SPA, these were primarily identified in the sea outside the nearshore area (>1km), with significant numbers of common scoter being observed throughout the over wintering period.

4.6.1 Common scoter

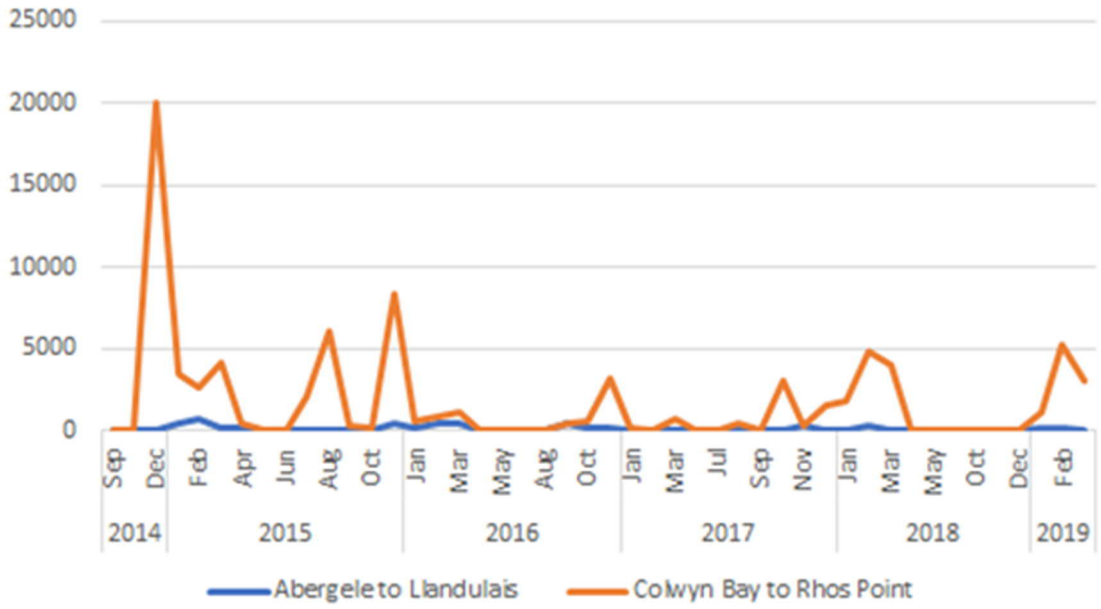
4.6.1.1 WeBS data

The WeBS sector counts from the last five years is plotted in Figure 4.1 whilst the counts recorded for different months is summarised in Table 4.2.

This data shows that common scoter is present over winter in both the Abergele to Llanddulas and the Colwyn Bay to Rhôs Point sectors, with the latter supporting large numbers (typically 5,000 – 8,000, with a peak of 20,000 in December 2014). This is consistent with the wintering bird survey results from 2019 – 2020 (see Section 4.6.1.2) which also recorded large rafts of thousands of common scoter offshore from Colwyn Bay.

The trends in bird numbers vary between years but the majority of high bird counts appear between October and March, with the notable exception of a peak in August 2015 which is atypical for the species (a winter resident) and so not considered relevant to this analysis.

Figure 4.1: Common scoter sector counts from 2014-2019



Source: BTO, 2020

Table 4.2: Common scoter counts per month

Month	Abergele to Llanddulas							Colwyn Bay to Rhôs Point						
	2014	2015	2016	2017	2018	2019	Average	2014	2015	2015	2017	2018	2019	Average
Jan		415	200	0		200	**204**		3000	350	200	1800	1000	**1270**
Feb		710	461	6	386	230	**359**		2000	400	5	4500	5000	**2381**
Mar		206	505		0	4	**179**		4000	600	730	4000	3000	**2466**
Arp		203	0	0			**68**		300	0	1	0		**75**
May		4					**4**		0	101		4		**35**
Jun									0	0				**0**
Jul									2100		0			**1050**
Aug									6000	0	400			**2133**
Sep	51	0	420		0		**118**		300	4	0			**101**
Oct	53	0	161	0	0		**43**		200	400	3000	1		**900**
Nov				268	52		**160**							
Dec		401	220	0	44		**166**	20000	8000	3000	1500			**8125**

Source: BTO, 2020

4.6.1.2 Wintering bird surveys

The wintering bird surveys recorded observations of common scoter on all four site visits. The common scoter observations from the wintering bird surveys are summarised in Table 4.3 below, whilst full results are available in the Over Wintering Bird Survey Report[9].

Table 4.3: Summary of common scoter observations during wintering bird surveys

Site	Date	Overall Count	Summary of observations
Old Colwyn Coastal Defence and Active Travel	22 Nov 2019	c.2000	● Scattered medium to large rafts of birds (50-500) were visible from the coastal footpath, up to 1-3km out to sea. ● Two small rafts of 13-20 birds were recorded within 500m of the coastline for short periods* before returning to the larger groups.
	09 Dec 2019	c. 2000	● Large rafts of birds (approximately 1000 individuals) were visible from coastline, approximately 1.5-2km out to sea. ● Small rafts of birds (three and 23 individuals) were observed within 500m of the bay for short periods* of time before returning to the larger groups.
	06 Jan 2020	c. 1000	● Large rafts of birds (approximately 1000 individuals) were visible from coastline, approximately 2-3km out to sea. ● Small rafts of birds (approximately 6 - 21 individuals) were observed within 500m of the bay for short periods[10] of time before returning to the larger groups.
	16 Jan 2020	c. 1300	● Scattered medium to large rafts of birds (40-300) were visible from the coastal footpath. The closest of these (40 individuals) was recorded approximately 500mm from shore but did not drift closer during the time observed.
Colwyn Bay Waterfront Phase 2b	06 Dec 2019	c. 700	● Scattered medium to large rafts of birds (50-300) were visible, at least 1km out to sea.
	09 Dec 2019	c. 1200	● Large, scattered raft (1200) visible, at least 1km out to sea.
	06 Jan 2020	c. 800	● Scattered medium to large rafts of birds (50-300) were visible from the coastal footpath, at least 1km out to sea. ● One small raft of three birds was recorded approximately 500m from the coastline but did not drift closer during the time observed.
	16 Jan 2020	c. 800	● Large raft (800) visible, at least 1km out to sea.
	26 Feb 2021	c. 1000	● Observed in a large raft of 500-1000 birds near the wind farm (c.2km). Smaller rafts of 5 and 6 birds were observed within 500m. A further 28 individuals were located c.800m away to the east (within the Phase 1 area).
	23 Mar 2021	c. 250	● 58 birds were observed feeding within 500m of the RLB with a further 4 located within 300m (to the east, within the Phase 1 area). A larger raft of 250 birds was observed feeding 1km away, out from the Old Colwyn area and a smaller raft of 50 birds was observed feeding c.700m awa (out from the Phase 1 area).
	28 Apr 2021	3	● Out at sea (1km) in a small raft. The sea was particularly choppy, and birds were difficult to locate and identify during the survey.
Colwyn Bay Phase 1abc[11]	22 Nov 2019	c. 2000	● Scattered medium to large rafts of birds (50-500) were visible from the coastal footpath, up to approximately 1-3km out to sea.

Source: Mott MacDonald, 2021

In summary, the key findings from the wintering bird surveys are:

[10] Typically, five to 15 minutes.

[11] Supplementary data from one visit.

- Common scoter were consistently present in large rafts over 1km from shore during every visit;
- The largest numbers recorded were from the November and December visits (rafts of approximately 2000 individuals);
- Smaller rafts (ranging from between 50-500 individuals) were observed between 500m – 1km from shore but did not drift closer; and
- Small numbers of individuals (typically up to 20) were observed within 500m for periods of five to 15 minutes before re-joining the larger rafts offshore.

4.6.1.3 Conclusions

On the basis of the WeBS sector counts and field observations it is clear that common scoter use Colwyn Bay in large numbers over winter, with the key period appearing to be October to March. This is consistent with other research of common scoter in the local area which also concluded October to March as being the key period for this species[12]. The most important area appears to be approximately 1km offshore where large rafts of birds gather to rest and forage. Areas within approximately 500m appear to be used infrequently and only by very small numbers of individuals in short duration, so are unlikely to be of significant importance to the population.

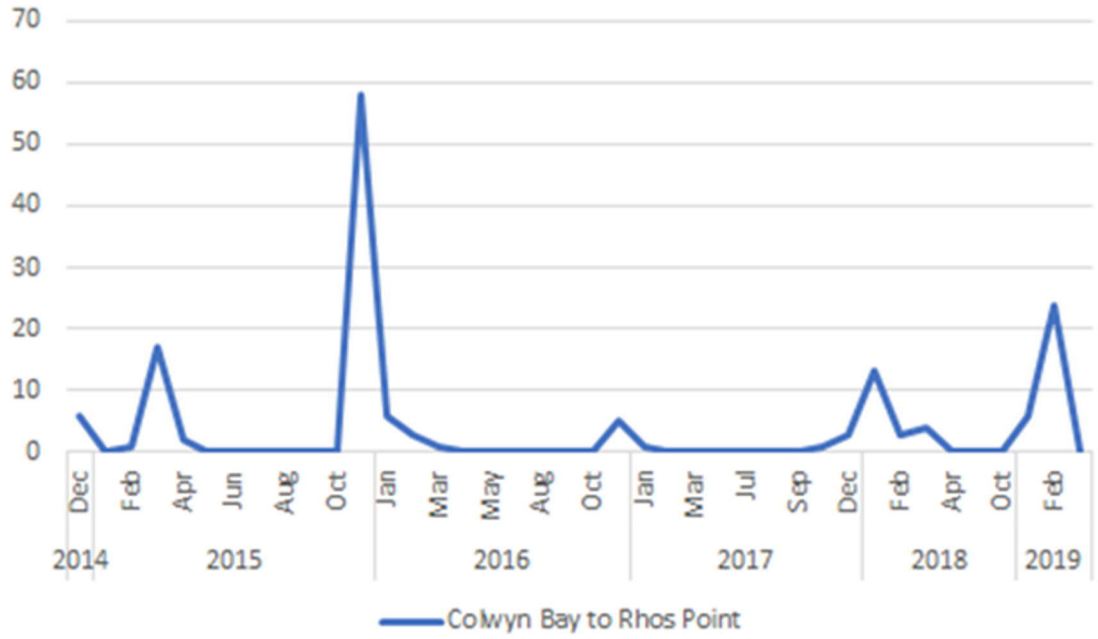
4.6.2 Red-throated diver

4.6.2.1 WeBS data

Red-throated diver was only recorded within the Colwyn Bay to Rhôs Point sector during October to March. The WeBS sector counts from the last five years are plotted in Figure 4.2 below.

[12] Kaiser, M.J, et al. 2002. Predicting the displacement of common scoter *Melanitta nigra* from benthic feeding areas due to offshore windfarms. COWRIE funded project under BEN-03-2002. Centre for Applied Marine Sciences, School of Ocean Sciences, University of Wales, Bangor; NERC Centre for Ecology and Hydrology; School of Biological Sciences, University of East Anglia.

Figure 4.2: Red-throated diver sector counts from 2014-2019



Source: BTO, 2020

Red-throated diver was only recorded during the period October to March and numbers appear inconsistent between years. The peak counts returned are 58 and 24 from December 2015 and February 2019 respectively.

4.6.2.2 Wintering bird surveys

The wintering bird surveys undertaken only recorded red-throated diver during one survey visit, on the 6th December 2019, where two individuals were recorded within approximately 800m offshore in the Scheme area.

4.6.2.3 Conclusions

Red-throated diver have been confirmed as present in the Colwyn Bay area over winter (strictly between October and March) but in low numbers, indicating that this is unlikely to be a key area of importance for this species. This is consistent with distribution maps[13] which show Colwyn Bay to be located outside of the main hotspots for this species.

4.6.3 Little gull

No records of little gull were returned from the WeBS sector counts nor was this species recorded during any of the survey visits.

WeBS data online for little gull presents the annual peaks for this species for Colwyn Bay and North Clwyd Coast for the last five years. The peak count for this species was one bird for 2015/2016. The JNCC report (Lawson *et al.*, 2016) which assessed numbers and distribution of wintering waterbirds and seabirds to inform the SPA citation indicates that this species is largely associated with the areas further offshore from the Dee and Ribble Estuaries. For the purposes

[13] Lawson, J., Kober, K., Win, I., Allcock, Z., Black, J., Reid, J.B., Way, L. and O'Brien, S.H., 2016. An assessment of the numbers and distributions of wintering waterbirds and seabirds in Liverpool Bay/Bae Lerpwl area of search. JNCC Report No. 576.

of this assessment, this species is considered likely to be a passage species migrating through in Autumn.

4.6.4 Common and little tern

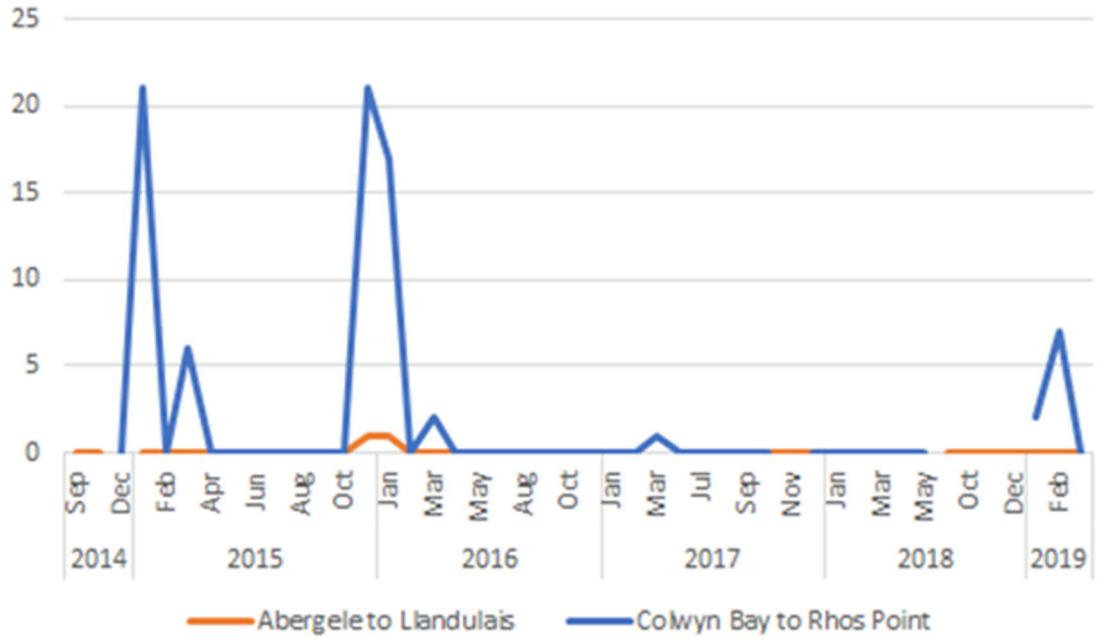
No records of any common or little terns were returned from the WeBS sector counts, whilst these species were not recorded during the wintering bird surveys (as anticipated). Common and little tern are known to be summer breeding species in the SPA.

Common terns are known to breed on shingle beaches and gravelly areas, which are notably absent from the Site, whilst only one known little tern breeding colony is known in Wales at Gronant Dunes (approximately 24km north east).

4.6.5 Assemblage Species – Red-breasted merganser

Red-breasted merganser was not recorded during the wintering bird surveys undertaken at the site, whilst only low numbers of this species were returned from WeBS sector counts from winter months (peak count of 21; see Figure 4.3 below), with typical values for this species being either absent or low single figures.

Figure 4.3: Red-breasted merganser sector counts from 2014-2019



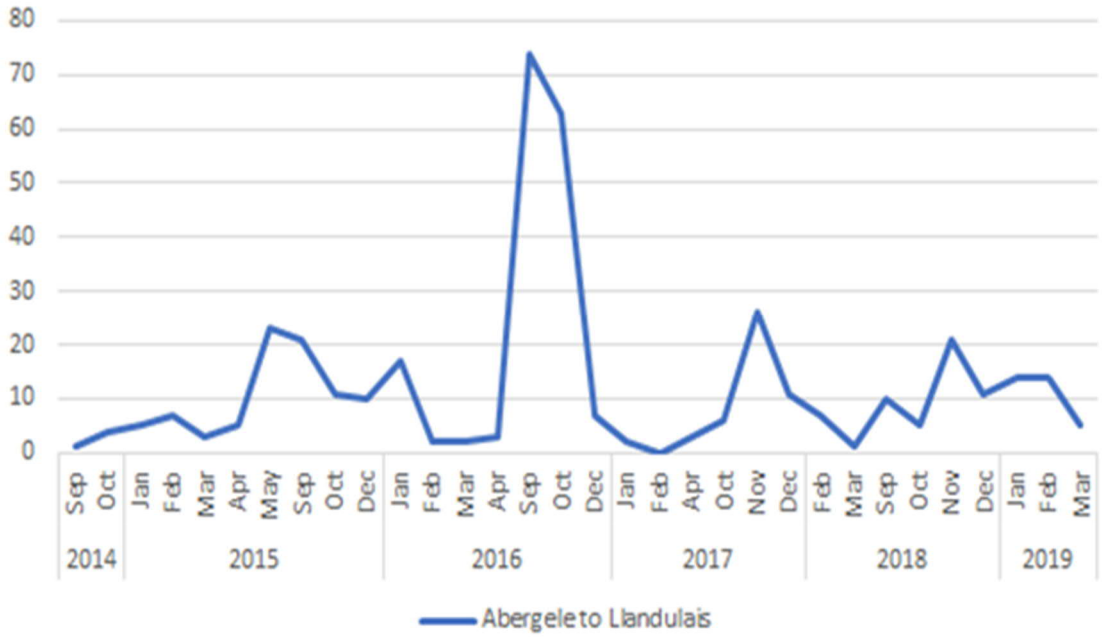
Source: BTO, 2020

4.6.6 Assemblage Species – Cormorant

4.6.6.1 WeBS data

Cormorant appears to be present in small numbers throughout the year from the WeBS sector counts (see Figure 4.4), with larger numbers present in winter months. There appears to be no defined trend in numbers using the area with a typical peak of cormorant being c20 birds.

Figure 4.4: Cormorant sector counts from 2014-2019



Source: BTO, 2020

4.6.6.2 Wintering bird surveys

The wintering bird surveys did record this species consistently across the survey period, loafing on manmade structures along the bay as well as feeding both close to shore (within 1-400m) and out at sea amongst common scoter. The largest counts were recorded in the November and December surveys within the vicinity of the Old Colwyn Coastal Defence and Active Travel survey area (104 and 86 respectively), before dropping to 18 and one individuals observed in the January visits. Similar trends were observed for the Phase 2b area.

Survey results for cormorant are summarised in Table 4.4 below.

Table 4.4: Summary of cormorant observations during wintering bird surveys

Site	Date	Overall Count	Summary of Observations
Old Colwyn Coastal Defence and Active Travel	22 Nov 2019	104	• Majority of birds observed day roosting / loafing on manmade structures in the bay; and • Several individuals observed feeding at sea (close to common scoter) and inshore (within 100m of the bay).
	09 Dec 2019	86	• Majority of birds observed day roosting / loafing on manmade structures in the bay; and • A few individuals observed feeding at sea.
	06 Jan 2020	18	• Majority of birds observed basking on rocks or feeding inshore (within 400m of the bay).
	16 Jan 2020	1	• Flying at sea.
Colwyn Bay Waterfront Phase 2b	06 Dec 2019	46	• Majority of birds observed day roosting / loafing on manmade structures in the bay; and • A few individuals observed flying and feeding at sea.
	09 Dec 2019	42	• Majority of birds observed day roosting / loafing on manmade structures in the bay; and

Site	Date	Overall Count	Summary of Observations
			● A few individuals observed feeding at sea.
	06 Jan 2020	16	● Majority of birds observed day roosting / loafing on manmade structures in the bay; and ● A few individuals observed feeding at sea.
	16 Jan 2020	16	● All birds observed day roosting / loafing on manmade structures in the bay.
	26 Feb 2021	7	● Individuals were observed roosting, loafing, and feeding. The nearest bird was observed roosting on the harbour breakwater within 50m of the red line boundary with a further 7 birds within 150m scattered across the intertidal area loafing and feeding.
	23 Mar 2021	4	● Individuals were observed roosting and feeding scattered throughout the intertidal area from Rhôs Point to Old Colwyn.
	28 Apr 2021	4	● Four birds were observed loafing and roosting within the intertidal area of Old Colwyn. A further 3 birds were feeding within 500m of the red line boundary and on bird was observed roosting on a floating log c.800m north-east of the red line boundary
Colwyn Bay Phase 1abc**	22 Nov 2019	5	● Flying overhead.

Source: Mott MacDonald, 2021

4.6.6.3 Conclusions – Assemblage of Other Waterbirds

These results indicate that Colwyn Bay is unlikely to be of key importance for red-breasted merganser but does appear to be more well used by cormorant, albeit still in relatively low numbers in the context of the SPA population. Considering the distances and behaviour observed during surveys cormorant appear to have a degree of habituation to any existing disturbance from the shore, which is not unexpected in a species which uses the shore for roosting and loafing. The majority of observations of this species were of smaller numbers of birds loafing within the survey area.

5 Assessment of Likely Significant Effects

The assessment of Likely Significant Effects (LSE) for each of the identified activities on the designated sites and interest features is summarised in Table 5.1, with a summary provided in Table 5.2.

Table 5.1: Assessment of LSE

Designated site	Qualifying feature	Assessment of significance	LSE of the project during	
			Construction	Operation
Bae Lerpwl / Liverpool Bay SPA	Common scoter (wintering)	**Construction** Effects are considered in respect of the impact pathways above: ● **Pollution:** In the absence of mitigation, a pollution event, such as oil spills, from the dredger or machinery cannot be ruled out. Such a pollution event would degrade habitat quality, foraging availability and injure birds ● **Disturbance:** Common scoter can be sensitive to disturbance. Due to lack of research of construction disturbance in relation to over wintering common scoter, recommended safe working distances during the breeding season (sensitive period) have been used as a broad guidance for the proposed works. Recommended safe working distances for nesting common scoter during construction is 300-800m. Survey work undertaken on site indicated only small numbers of individuals appeared to come within c.500m of shore (<25 individuals or small rafts) whilst a few rafts of approximately 40 birds were recorded to rest within offshore areas (c.500m-1km). The majority of birds rested further offshore (approximately 1km-3km). On this basis, the key sources of disturbance are considered below: – *Beach recharge*: Offshore dredging and delivery of sand via floating pipeline would be within close proximity of large rafts of birds out to sea and could cause significant disturbance and population level; and – *Other onshore disturbance:* Other disturbance from construction, such as additional human presence, noise and artificial lighting, represent an increase to the existing baseline but are not new sources of disturbance for the area. Such effects would be temporary and are considered unlikely to affect birds beyond the above 300-800m threshold referenced above. Based on survey work this would result in temporary displacement to small numbers of individuals. The total length of shoreline (measured as the coast itself) within the SPA is approximately 125km, of which only approximately 1.5km (1.2% falls within the Site), such that there remains a large area of shoreline habitat (i.e. habitat within 500m of the coast where waters are shallower) available for foraging birds within the SPA. Such effects would therefore be considered *de-minimis* and not anticipated to significantly affect the population integrity. ● **Changes in turbidity:** Changes in turbidity would be localised and mostly associated with the shoreline (i.e. the beach recharge), such that they are likely to disperse and attenuate before affecting foraging for this species. As such, these temporary affects are considered unlikely to significant affect the population integrity.	**Yes**	**No**

Designated site	Qualifying feature	Assessment of significance	LSE of the project during	
			Construction	Operation
	Red-throated diver (wintering)	**Construction** Effects are considered in respect of the impact pathways above: ● **Pollution:** In the absence of mitigation, a pollution event, such as oil spills, cannot be ruled out. Such a pollution event would degrade habitat quality, foraging availability and injure birds ● **Disturbance:** Red-throated diver can be sensitive to disturbance. Due to lack of research of construction disturbance in relation to over wintering common scoter, recommended safe working distances during the breeding season (sensitive period) have been used as a broad guidance for the proposed works. Recommended safe working distances for nesting red-throated diver during construction is 500-750m. Survey work identified only two individuals within this distance whilst the WeBS sector counts indicate that relatively low numbers are present in this area (key areas of importance being further north along the coast, offshore from the Dee and Ribble Estuaries). On this basis, displacement of individuals to other areas is considered unlikely to significantly affect the integrity of the SPA population. ● **Changes in turbidity:** Changes in turbidity would be localised and mostly associated with the shoreline, such that they are likely to disperse and attenuate before affecting foraging for this species. As such, these temporary effects are considered unlikely to significantly affect the population integrity. As the population of red-throated diver is reported to be 1171 individuals, the numbers identified in the WeBS data (peaked at 54 individuals in December 2015) and the wintering bird surveys (peaked at two individuals in December 2019), the potential for the above impacts to significantly affect the population integrity is considered to be *de minimis*.	**No**	**No**
	Little Gull	The SPA is designated for non-breeding use by little gull, which were not recorded during the wintering bird species or WeBS sector counts. No likely significant effect on the integrity of the population from works is anticipated.	**No**	**No**
	Little tern	The SPA is designated for summer use by little tern, but this species was not recorded in the WeBS sector counts indicating this area is unlikely of importance to the SPA population. The upper shore habitats within the Scheme footprint do not offer any particular breeding opportunities for these species and the site is approximately 24km from the known breeding colony (Gronant Dunes). The wintering bird surveys and WeBS data also identified a lack of fish-feeding bird species in the Scheme area, which suggests it is less important for this species. At this distance, no direct or indirect effects on breeding sites are anticipated as a result of the works, whilst any	**No**	**No**

Designated site	Qualifying feature	Assessment of significance	LSE of the project during	
			Construction	Operation
		disturbance of foraging individuals (if present) would be low numbers and considered unlikely to significant affect the population.		
	Common tern	The SPA is designated for summer use by common terns. The upper shore habitats within the Scheme footprint do not offer any particular breeding opportunities for these species. Common terns are known to breed on shingle beaches and gravelly areas, however have not been recorded breeding on the shingle habitat at Pensarn with the nearest known breeding colony recorded at Gronant c.13.5km east of Pensarn. The wintering bird surveys and WeBS data also identified a lack of fish-feeding bird species in the Scheme area, which suggests it is less important for this species. On this basis, no direct or indirect effects on breeding sites are anticipated as a result of the works, whilst any disturbance of foraging individuals (if present) would be low numbers and considered unlikely to significant affect the population.	**No**	**No**
	Waterbird assemblage	Natural England advice[14] on the vulnerability of this feature specifically cites that the most sensitive species, upon which the feature vulnerability is based, is common scoter. Disturbance effects on common scoter are set out above, which conclude that likely significant effects cannot be ruled out for these species during construction, so a likely significant effect is also concluded for the waterbird assemblage in respect of pollution and dredger movements. Other species listed as part of the waterbird assemblage include red-breasted merganser, recorded in extremely low numbers (and not observed during the surveys) and cormorant, which was recorded using manmade features close to shore and appeared to be well acclimatised to disturbance. It is therefore anticipated that this species would either readily habituate to increased shoreline disturbance or would be displaced to similar features in the wider surrounds. Given the numbers and activity recorded (largely loafing and foraging), no significant effects on the integrity of the SPA population would be anticipated.	**Yes**	**No**
Y Fenai a Bae Conwy / Menai Strait and Conwy Bay SAC	All qualifying habitat types	The project has the potential to impact upon habitat types in the following ways**:** • Incidental Pollution events • Water quality change (turbidity) • INNS	**No**	**No**

[14] Natural England (October 2012) Liverpool Bay / Bae Lerpwl Special Protection Area –Advice under Regulation 35(3) of The Conservation of Habitats and Species Regulations 2010 (as amended). Version 6.5.

Designated site	Qualifying feature	Assessment of significance	LSE of the project during	
			Construction	Operation
		Incidental pollution spills: There is potential for contaminants to enter the marine environment, through the release of contaminated bilge water, petroleum leaking from machinery and working vessels both onshore and offshore and contamination by antifouling compounds. However, the scale of the potential contaminant release is expected to be several orders of magnitude below what would be considered significant enough to impact the designated features of the Menai Straits and Conwy Bay SAC. Additionally, the local coastal waters are a highly dynamic system, and any contaminant release would be expected to quickly disperse into the wider environment. **Turbidity:** As part of the beach recharge works large quantities of fine sand will be deposited on the upper foreshore region. It is likely due to wind transportation and the potential for ruptures occurring in the piping, that some sediment will be lost to the marine environment. Once entrained the sediment will be advected through coastal processes to the wider marine environment. This could increase turbidity across sensitive areas in the SAC. However, any increases in suspended particulate matter are expected to be short lived in duration. Equally any sediment entering the coastal waters will be transported quickly away from the designated sites by the tides and coastal currents. In this case no LSE are identified. **INNS:** It is possible for INNS to be introduced to / spread across the site as a result of vehicles/vessels and machinery on the foreshore and coastal waters. Due to the distance of the SAC habitats from the Scheme's extent (approximately 3km west) no impacts are anticipated on the designated habitats from the introduction of INNS as these are too far away for an impact to occur. Therefore, no LSE are identified. However, it should be noted that a biosecurity risk assessment has been produced for the Scheme regardless and will be adhered to by operator working on the foreshore.		

Source: Mott MacDonald, 2021

Table 5.2: Summary of LSE

Designated Site	Designated Feature	Potential Impact	Construction phase LSE	Operational phase LSE
Liverpool Bay SPA	Common Scoter (*Melanitta nigra*)	Disturbance	Yes	No
		Pollution event	Yes	No
		Water quality change (suspended sediment)	No	No
	• Red throated diver (*Gavia stellata*)	Disturbance	No	No
		Pollution event	No	No
		Water quality change (suspended sediment)	No	No
	• Little gull (*Larus minutus*) • Little tern (*Sterna albifrons*) • Common tern (*Sterna hirundo*)	Disturbance	No	No
		Pollution event	No	No
		Water quality change (suspended sediment)	No	No
	An internationally important assemblage of birds present as a qualifying feature	Disturbance	Yes	No
		Pollution event	Yes	No
		Water quality change (suspended sediment)	No	No
Y Fenai a Bae Conwy / Menai Strait and Conwy Bay SAC	All qualifying habitat types	INNS	No	No
		Pollution event	No	No
		Water quality change	No	No

Source: Mott MacDonald Ltd

5.1 In-combination assessment

Under the Habitats Regulations, it is a requirement to consider any other projects or plans that could present a significant effect on a designated site or feature when considered alone or in-combination with the proposed Scheme. Whilst there is no legal definition of what constitutes a plan or project for the purposes of the Habitats Regulations, PINS Advice Note 10 advises that the following plans/projects should be taken into account:

- Projects under consultation;
- Permitted application(s) not yet implemented;
- Submitted application(s) not yet determined;
- Projects on the National Infrastructure's (PINS) programme of projects;
- Projects identified in the relevant development plan (and any emerging development plans – with appropriate weight being given as they move closer to adoption) recognising that much

information on any relevant proposals will be limited and the degree of uncertainty which may be present; and

- Any marine licence within the Colwyn Bay area.

Following a search using the above criteria, the following projects were identified for consideration for in-combination effects in this HRA.

Table 5.3: Projects identified for in-combination effects

Plan or Project	Description	Screened in	Justification for screening decision
Rhôs Point	Rhôs Point, partially within Scheme RLB, comprises a redevelopment project to build a new restaurant, café and small ice cream retail unit created around a courtyard focussed on the Grade II listed former pier toll booth to the northern side of Rhôs harbour.	✓	As both projects are in the same area it is assumed that similar receptors could be impacted from the works associated with both projects. As a result, it is possible for in-combination effects to occur.
Penrhyn Bay Coastal Defences	Approximately 1.7km to the west of the Scheme. The project involves the construction of a T-shaped rock armour groyne, beach reinstatement alongside a re-nourishment of the central upper beach, and public realm enhancements to the promenade. Construction is anticipated to start in March 2022.	✓	It is possible that the two projects could overlap as construction for both the Scheme and Penrhyn Bay are due to commence in the first quarter of 2022. As they are both in the same area it is assumed that similar receptors could be impacted from the works associated with both projects. As a result, it is possible for in-combination effects to occur.
Old Colwyn Coastal Defence and Active Travel and Splashpoint	Immediately adjacent to the Scheme. **Old Colwyn** The project involves the construction of rock revetment and raising of the promenade, with construction of new pedestrian accesses and a dedicated fishing platform. Works are anticipated to start in September 2021 (subject to funding) and will last for approximately 2 years. **Splashpoint** Works comprising a short section of rock revetment in the most at risk area of the Phase 3 (Old Colwyn) area. Completion is currently ongoing due to completed by the end of 2021	✓	As both projects are in the same area it is assumed that similar receptors could be impacted from the works associated with both projects. As a result, it is possible for in-combination effects to occur.
Llanddulas to Kimmel Bay Coastal Defence Improvements (Conwy County)	This project is approximately 3.5km from the eastern extent of the Scheme and comprises six discrete sites over an 11km length of coastline, extending from Llanddulas to Kinmel Bay. The current scope of works at Llanddulas Beach includes the construction of two setback flood walls of ~650m and ~250m in length and enhancement of a short section of rock revetment in the eastern end of the area (~170m), with	✓	Both projects are likely to overlap (the Scheme is due to commence in March 2022 and to take place for approximately two years). As both projects are in the same area it is assumed that similar receptors could be impacted from the works associated with both projects. As a result, it is possible for in-combination effects to occur.

Plan or Project	Description	Screened in	Justification for screening decision
	rock toe and seawall toe protection and periodical beach recharge at Llanddulas Tip. Works further east are anticipated to comprise seawall raising, rock revetment construction and reinstatements of sand dunes. Construction is anticipated to commence in March 2022 for two years.		
Llandudno Coastal Defences	Located approximately 4.5km west from the Scheme. The project is currently at detailed design stage and limited information is available however, works are anticipated to involve increasing the height of the seawall at west shore with possible beach nourishment activities at north shore. The works are anticipated to start in March 2022; however the construction period is unknown.	✓	It is possible that the two projects could overlap as construction for both the Scheme and Llandudno coastal defences works are due to commence in the first quarter of 2022. As they are both in the same area it is assumed that similar receptors could be impacted from the works associated with both projects. As a result, it is possible for in-combination effects to occur.
Central Rhyl Coastal Defences	Located approximately 14.2km east of the Scheme. The project comprises construction of concrete stepped revetment and promenade raising in the western half and construction of rock toe scour protection in the eastern half. The works are anticipated to start in March 2022 with a construction period of 3 years.	✓	Although Rhyl Central is located approximately 14km to the east it is anticipated that construction will start during the same period as the Scheme. As a result, it is possible for in-combination effects to occur.
East Rhyl Coastal Defences	Involves the construction of a rock armour revetment designed to absorb wave energy during future storm events. The sea wall is also being replaced with a larger structure and the promenade is being raised by less than 1m. During construction the works will occupy 13 hectares of the Promenade and an area of beach between the Pavilion Theatre and Rhyl Golf Course. This project is currently under construction and is anticipated to complete in early Summer 2022.	✓	Although east Rhyl coastal defence works is located approximately 17km to the east, construction is currently underway and there is likely to be an overlap given completion is anticipated in Summer 2022. As a result, it is possible for in-combination effects to occur.
Central Prestatyn Coastal Defence Improvements.	Approximately 17km from the eastern end of the Scheme. This project involves the construction of a flood embankment (approximately 1.66km in length). The new flood embankment will be set back from the existing defence and will surround the edges of Rhyl Golf Course. In addition to	✓	Although Prestatyn is located approximately 17km to the east it is possible that construction will start during the same period as the proposed Scheme. As a result, it is possible for in-combination effects to occur.

Plan or Project	Description	Screened in	Justification for screening decision
	the embankment rock armour will be placed along the west frontline tie-in location. The works are anticipated to commence in March 2022 and to last for approximately 3 years.		

Table 5.4 below shows approximate distances of the above projects to the Scheme, as well as distances from each other. Multiple projects comprise waterfront projects, such as coastal defence schemes, which given the similarity of the works and the potential receptors effected, is likely to cause an in-combination effect with the Scheme.

Table 5.4: Matrix showing approximate distances of projects to Scheme and each other

Distance matrix	Colwyn Bay Waterfront Project Phase 2b (the Scheme)	Rhôs Point	Old Colwyn Coastal Defences and Active Travel and Splashpoint	Penrhyn Bay Coastal Defences	Llandudno Coastal Defences	Llanddulas to Kinmel Bay Coastal Defence Improvements	Central Rhyl Coastal Defences	Central Prestatyn Coastal Defences
Colwyn Bay Waterfront Project Phase 2b	-	Adjacent to Scheme RLB	0.5km	1.70km	4.5km	3.5km (minimum)	14.2km	17km
Rhôs Points	Adjacent to Scheme RLB	-	2.7km	2.2km	6km	5.6km	15.6km	18.4km
Old Colwyn Coastal Defences and Active Travel and Splashpoint	0.50km	2.7km	-	4.9km	8.5km	3.3km	14km	16.8km

Distance matrix	Colwyn Bay Waterfront Project Phase 2b (the Scheme)	Rhôs Point	Old Colwyn Coastal Defences and Active Travel and Splashpoint	Penrhyn Bay Coastal Defences	Llandudno Coastal Defences	Llanddulas to Kinmel Bay Coastal Defence Improvements	Central Rhyl Coastal Defences	Central Prestatyn Coastal Defences
Penrhyn Bay Coastal Defences	1.70km	2.2km	4.9km	-	3.9km	7.8km	17.6km	20.2km
Llandudno Coastal Defences	4.5km	6km	8.5km	3.9km	-	11.7km	21.5km	24km
Llanddulas to Kinmel Bay Coastal Defence Improvements	3.5 km (minimum)	5.6km	3.3km	7.8km	11.7km	-	10.8km	13.6km
Central Rhyl Coastal Defences	14.2km	15.6km	14km	17.6km	21.5km	10.8km	-	2.9km
Central Prestatyn Coastal Defences	17km	18.4km	16.8km	20.2km	24km	13.6km	2.9km	-

Source: Mott MacDonald, 2021

5.2 Screening conclusion

The conclusion of the Stage 1 Screening assessment is that a **likely significant effect** to qualifying features of the **Liverpool Bay SPA** designated site will occur during the construction phase of the Scheme. The only features anticipated to be impacted are common scoter. No likely significant effect has been identified for Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC, alone or In-combination.

The **likely significant effects** include the potential for pollution including oil spills, as well as noise and visual disturbance from beach recharge activities. The assessment also considers an **in-combination effect** to be possible, as seven other projects with similar proposed working methods and works programmes are within close proximity of the Scheme. As the working methods are similar, it is considered unlikely that any unique **likely significant effects** would occur from any of the aforementioned Projects, rather a compounding level of disturbance.

6 Mitigation

For the purpose of this assessment, it has been assumed that the Scheme will follow and implement all relevant best practice guidelines and working methodologies for the duration of construction, such as pollution prevention, noise, and dust management, in addition to biocontrol measures to prevent the spread of INNS.

6.1 Proposed mitigation

- The core wintering bird season (October to March, based on the data in Section 4.6) would be avoided during the beach recharge works;
- Due to tidal constraints, low tide working would be implemented for intertidal construction works relating to the seawall repairs, terminal groyne works and outfall extensions, this will minimise disturbance from construction;
- Toolbox talks would be undertaken with site staff prior to works commencing to highlight the importance of the SPA habitat and wintering birds, particularly their sensitivity to disturbance and what types of activities can disturb the birds, in order to minimise the disturbance as much as possible from construction;
- Works would be undertaken under an Environmental Management Plan, which would reduce noise and the risk of pollution;
- Avoidance of excessive working hours on site, as far as is practicable; and
- Use of directional lighting, hoods, and cowls to reduce light spill onto marine habitats.

7 Appropriate Assessment

7.1 Appropriate Assessment

7.1.1 Assessment of the project alone

The Stage 1 assessment screened in the following designated interest features:

- Common scoter; and
- Liverpool Bay SPA waterbird assemblage

Likely significant effects are anticipated during construction, with the following impact pathways identified:

- Disturbance to large rafts of common scoter over 1.0km from the shoreline from the dredger and pipeline associated with beach recharge activities;
- Disturbance to waterbirds of the SPA assemblage utilising the shoreline and intertidal area from construction works and associated plant and vehicle movements; and
- Damage to habitat and birds from pollution such as oil and fuel spills.

Following implementation of the mitigation set out in Section 6.1, Table 7.1 below documents the assessment of significant effects on Liverpool Bay SPA, in respect of the above impact pathways, in line with Stage 2 of the HRA process.

Table 7.1: Liverpool Bay SPA Appropriate Assessment

Designated interest feature	Assessment of effects	Effect on integrity of designated features
• Common scoter • Liverpool Bay SPA waterbird assemblage	**Disturbance:** The Scheme design has acted to reduce disturbance from sea vessels by transporting material by road. Mitigation for the Scheme includes undertaking certain works, such as beach renourishment, which would be highly disturbing, outside of the overwinter period when common scoter are present in order to minimise disturbance to rafts of common scoter. Combined with other best practice measures, including low tide working on the foreshore to reduce disturbance levels, any impacts on birds, particularly at a population level are considered *de-minimis* and are not anticipated to significantly affect the population integrity.	Negligible
	Pollution event: The Scheme involves working on the foreshore, for seawall repairs and maintenance, and therefore poses the possibility for a pollution event (e.g. machinery or plant leak) that could result in the transmission of pollution into the marine environment. The Environmental Management Plan (EMP) will outline best practice working measures with regards to pollution prevention (e.g. ensuring spill kits are available, ensuring specific refuelling areas are used that are away from the marine environment, ensuring fuel is stored in double bunded containers etc.). A Marine Pollution Contingency Plan will be contained within the EMP which will include information on the prevention of the release of hydrocarbons, solid waste and plastics into the marine environment and how to deal with these should a pollution event of this nature occur. As a result of the above mitigation, it is	Negligible

Designated interest feature	Assessment of effects	Effect on integrity of designated features
	considered that any pollution event would be negligible and would not affect the integrity of these bird species.	

Source: Mott MacDonald Ltd

7.1.2 In-Combination Assessment

As set out in the Stage 1 screening assessment, cumulative effects from the Proposed Scheme and projects and plans (both in construction and operation) in the wider area need to be considered. The desk-based study identified seven projects within 2km (or that are hydrologically connected to the Scheme area) that would need to be considered to have an in-combination impact with the Proposed Scheme on the designated sites and features.

Table 7.2 below outlines the assessment of LSE on the designated sites and features in combination with the seven identified projects.

Table 7.2: Assessment of Likely Significant Effects

Plan or Project	Potentially affected designated site	Justification	LSE
Rhôs Point	Liverpool Bay SPA	The exact timings and dimensions of the Rhôs Point project are currently unknown but there is the potential that the timings of these could overlap. As a result, it is possible for the same receptors to be impacted from works at both locations. Potential in-combination effects include: ● Disturbance ● Pollution event The Rhôs Point project comprises the construction of a series of commercial units, including a restaurant. This project is set further inland from the Scheme, reducing the risk of disturbance to SPA bird species. Exact mitigation measures are unknown but are expected to include pollution prevention and contingency measures. The overlapping timeframe of the projects may temporarily reduce intertidal foraging opportunities in the Colwyn area. However, due to existing levels of disturbance, foraging opportunities in the surrounding area, and anticipated mitigation measures this is considered unlikely to impact the integrity of the species associated with these designations.	X
Old Colwyn Coastal Defence and Active Travel Scheme	Liverpool Bay SPA	The Old Colwyn Coastal Defence and Active Travel Scheme and the Scheme are set to overlap in terms of timing and both projects involve construction within the marine environment, approximately 0.5km from each other. As a result, it is possible for the same receptors to be impacted from works at both locations. Potential in-combination effects include: ● Disturbance; and ● Pollution event. The Old Colwyn project is anticipated to require construction of a rock revetment and a series of works to increase recreational capabilities such as increased pedestrian access and cycling routes with the potential for barge use to be required. Although the timings of this are not expected to coincide with the dredging associated with this Scheme, this may increase levels of offshore disturbance and increase the risk of pollution. Exact mitigation measures are unknown, but it is expected that measures to reduce disturbance on SPA bird species would be required, in addition to pollution prevention and contingency measures. The overlapping timeframe of the projects may temporarily reduce intertidal foraging opportunities in the Colwyn area. However, due to existing levels of disturbance, foraging opportunities in the surrounding area, and anticipated mitigation measures this is considered unlikely to impact the integrity of the species associated with these designations.	X
Penrhyn Bay Coastal Defences	Liverpool Bay SPA	This project and the Scheme are set to overlap in terms of timing and both projects involve construction within the marine environment. As a result, it is possible for the same receptors to be impacted from works at both locations. Potential in-combination effects include: ● Disturbance ● Pollution event The Penrhyn Bay project involves the construction of rock armour and also beach recharge activities. Although mitigation measures were unavailable for the Penrhyn Bay Coastal Defences project, it is anticipated that these will include mitigation to reduce levels of disturbance on SPA bird species, in line with this Scheme. On the basis of this, in addition to the distance	X

Plan or Project	Potentially affected designated site	Justification	LSE
		between the two projects, the number and distribution of notable birds recorded, and availability of suitable intertidal habitat in the surrounding area, such effects are considered unlikely to significantly affect the integrity of the SPA bird species. It is assumed that the project will implement an EMP that includes a Marine Pollution Contingency Plan outlining measures to prevent and reduce pollution events. Any in-combination effects are temporary as these are restricted to the construction phase. As a result of the above, no LSE are identified.	
Llandudno Coastal Defences	Liverpool Bay SPA	This project and the Scheme are set to overlap in terms of timing and both projects involve construction within the marine environment. The projects are approximately 4.5km away from each other, however it is assumed the projects may have similar marine receptors and SPA bird species due to their highly mobile nature. As a result, it is possible for the same receptors to be impacted from works at both locations. Potential in-combination effects include: ● Disturbance ● Pollution event The Llandudno project involves raising the height of the existing sea wall for coastal defence purposes. This poses the risk of impact from disturbance and increased levels of suspended sediment. The construction methodology for the project is currently unknown, however it is assumed that works will likely take place at low-mid tide to avoid working in areas of high water (for safety reasons). Anticipated levels of suspended sediment from the Scheme's construction are minor and restricted only to any sediment disturbance during the works that may be mobilised when the tide covers the working area. It is anticipated that mitigation measures will include reducing levels of disturbance on SPA bird species, in line with this Scheme. On the basis of this, in addition to the distance between the two projects and availability of suitable intertidal habitat, such effects are considered unlikely to significantly affect the integrity of the SPA bird species. It is assumed that the project will implement an EMP that includes a Marine Pollution Contingency Plan outlining measures to prevent and reduce pollution events (as the Scheme has done). The Scheme has a biosecurity risk assessment in place, and it is assumed similar measures will be in place for the Llandudno project as part of best practice construction measures. Any in-combination effects are temporary as these are restricted to the construction phase. As a result of the above, no LSE are identified.	X
Llanddulas to Kinmel Bay Coastal Defence Improvements	Liverpool Bay SPA	This project and the Scheme are both set to commence in March 2022 and to last for approximately 1½ to 2 years. Both projects involve construction within the marine environment. There is limited ecology documentation available for the Llanddulas to Kimmel Bay project, however due to their close proximity it is assumed the project has similar receptors as the Scheme. As a result, it is considered possible for in-combination effects to occur from: ● Disturbance ● Pollution event It is assumed that similar safeguard measures implemented in the EMP for this Scheme would be applied to the Llanddulas project. Additionally, in order to facilitate construction, it is likely that works within the inter-tidal area will take place at low tide, therefore reducing potential disturbance on SPA bird species such as common scoter. Exact mitigation measures proposed for the Llanddulas project are unknown but are anticipated to include additional measures to minimise potential disturbance to SPA bird species. Although in combination, these two projects may temporarily reduce intertidal foraging opportunities in the area, the	X

Plan or Project	Potentially affected designated site	Justification	LSE
		projects are located at least 3.5km from each other and there are suitable foraging opportunities in the area surrounding the projects. As a result, this is considered unlikely to impact the integrity of the species associated with these designations. In terms of operational effects, the exact requirements for this project are currently unknown but are expected to be similar to this Scheme; regular low-level maintenance and monitoring of defences. This may act to reduce long-term maintenance requirements by creating more resilient combined coastal defences, reduce frequency of intrusive repair work, and reduce levels of disturbance in the future. As a result, no LSE are identified.	
Central Rhyl Coastal Defences	Liverpool Bay SPA	This project and the Scheme are set to overlap in terms of timing and both projects involve construction within the marine environment. The projects are approximately 14km away from each other, however it is assumed the projects may have similar marine receptors and SPA bird species due to the highly mobile nature of these features. As a result, it is possible for the same receptors to be impacted from works at both locations. Potential in-combination effects include: ● Disturbance ● Pollution event Both projects are expected to implement an EMP that includes a Marine Pollution Contingency Plan outlining measures to prevent and reduce pollution events. Additionally, due to their distance apart and only minimal anticipated sedimentation levels, it is anticipated that there will be no in-combination effects from water quality. Any in-combination effects are temporary as these are restricted to the construction phase. Disturbance from the Central Rhyl project may result from construction activities, including piling. However, these are anticipated to be subject to timing restrictions such as working at mid to low tide to reduce disturbance on SPA species, and additional disturbance mitigation measures are expected to be consistent with this Scheme. On that basis, disturbance would also be anticipated to be of a similar nature to this Scheme and to only affect small numbers of birds during winter from works on the shore. Due to the number and distribution of birds recorded, the distance between the two projects and the abundant alternative opportunities elsewhere in the SPAs, such effects are considered unlikely to significantly affect the SPA bird species. As a result of the above, no LSE are identified.	X
Central Prestatyn Coastal Defences	Liverpool Bay SPA	This project and the Scheme are both set to be undertaken in March 2022 and both projects involve construction within the marine environment. The projects are approximately 17km away from each other, however it is assumed the projects may have similar marine receptors and SPA bird species due to the highly mobile nature of these features. As a result, it is possible for the same receptors to be impacted from works at both locations. Potential in-combination effects include: ● Disturbance ● Pollution event Disturbance from the Central Prestatyn Coastal Defence project could result from construction including sheet piling. Although full mitigation measures are unknown, it is expected that these will aim to reduce disturbance on SPA species and are expected to include pollution prevention and contingency measures. The more intensive construction activity is anticipated to be at the end of the 4-year construction period, by which point this Scheme is expected to have been completed. Due to the number and distribution of birds recorded, the distance between the two projects these effects are considered unlikely to significantly affect the SPA bird species.	X

Plan or Project	Potentially affected designated site	Justification	LSE
		As a result of the above, no LSE are identified.	

Source: Mott MacDonald Ltd, 2021

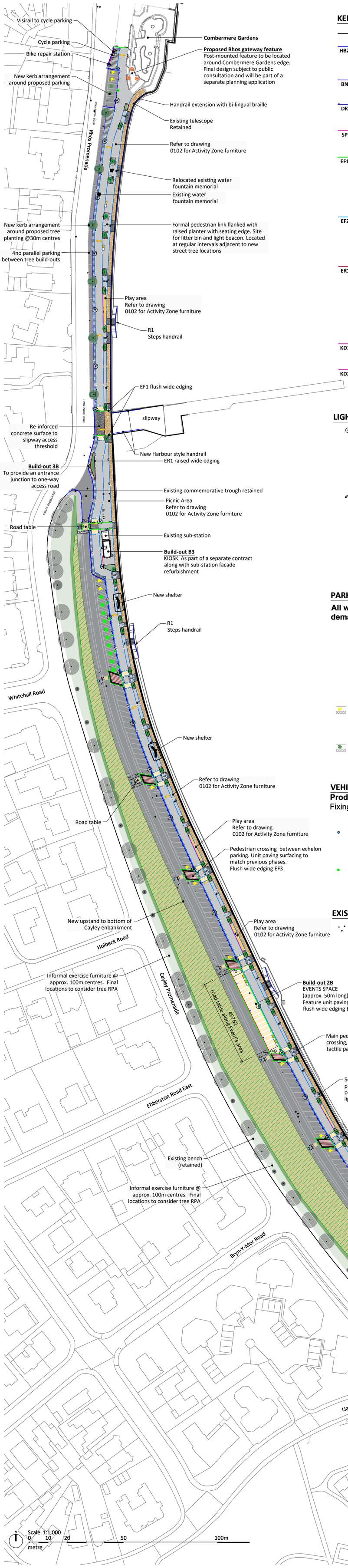
8 Conclusion

This report to inform an Appropriate Assessment provides evidence that, following the implementation of mitigation, any adverse effects on Liverpool Bay SPA and its qualifying features, alone or in-combination with other projects, are considered to be *de-minimis*, such that no adverse effect on the integrity of the Liverpool Bay SPA is anticipated.

No impact pathways to any other internationally designated sites have been identified.

This report is provided to inform the competent authority in completing their Appropriate Assessment of the project.

A. Scheme Design Drawings



KERBS AND EDGINGS OVERVIEW

Various existing retain

HB2 PCC half battered kerb
Size: 125 wide x 255 deep
(125mm upstand TBC)

BN PCC Pcc bullnose kerb (0-6 upstand)
Size: 125 wide x 150 deep

DK PCC Dropper kerb
Size: 125 wide x 150 deep

SP PCC Splayed kerb
Size: 125 wide x 150 deep

EF1 PCC wide edging - Flush
Size: 145 wide x 145 deep (centre stone);
Colour: Silver grey
Marshall's Conservation Kerb
Exposed aggregate pcc edging

EF2 Flat top pin pcc kerb
Size: 50 wide x 150 deep
250mm deep adjacent to raised planters
Refer to dwg.

ER1 PCC wide edging - Raised
125mm upstand
Size: 145 wide x 255 deep;
Colour: Silver grey
Marshall's Conservation Kerb
Exposed aggregate pcc edging
Locations: Selected planting beds

KD1 Kerb Drain Half Battered
See Drainage Discipline drawing for details

KD2 Kerb Drain Bullnose
See Drainage Discipline drawing for details

LIGHTING

Light columns - as per previous phases
Twin 'Kirium Pro Vision' LED luminaire on 10m tapered steel column @ approx 25m intervals. 'Kirium Pro 1' mounted at 10m (1000mm arm) to road, 'Kirium Pro 3' mounted at 6m (350mm arm) to pathway. As supplied by DW Windsor or similar approved. Lighting output to engineers's specification

Light Beacon
Product : Silka Max;
Supplier: DWWindsor or similar approved.
4.6m overall height cylindrical luminaire with LED incased in 1.20m high glazing tube.
Finishes/colours:
Column: Extruded aluminium: DB 706 Metalic Dark Grey
LED colours: White 40%; Red 30%; Green 30%
Fixing: Root mounted

PARKING BAY TYPES

All with Highway approved thermoplastic markings and demarcations

Standard parking bay
2.5 x 5m - perpendicular parking

Parallel parking bay
2 x 6m.

Echelon parking bay
2.5m wide.

Disable parking bay
2.5 x 5m with1.2m wide cross hatch marking access strip along bay length
Disabled bay symbol road markings

Electric car charger bay
As Disable bay
Approved symbol and 'EV ONLY' road markings

VEHICLE METER/CHARGER

Product : As per MOTT Highway's specification
Fixing: Bolt fixed to concrete pad @ approx. 90mm below surface and binder courses

Parking meter
Located at approx. 55m intervals along parking areas

Electric car charger tower
with proprietary impact protection
Product : As per MOTT Highway's specification

EXISTING MANHOLE COVERS

Location and sizes as per Topo survey

UNIT PAVING

80mm thick unit paving from the Kellen range with natural stone aggregate top layer and recycled concrete base. Paving types, sizes and colours subject as listed below. 30mm bedding.
Mortar joints: Narrow 6mm nominal
Mortar Type 1 - Instamac 'UltraScape Flowpoint Rapid' for areas less susceptible to overtopping conditions
Mortar Type 2 - Instamac 'Ultrascape Resi-Bond' resin mortar for area in close proximity to sea wall and susceptible to overtopping conditions
Construction types and build up to Engineer's specifications

Paving P1 - General paving 688m²
To road side pavement and kiosk paving
Size: 200 x 600mm
Product: Lavaro
Colours: Grijs/Rood, Grijs

Paving P2 - 300mm wide Trim 190m²
Size:100 x 300mm laid as soldier course, in repeated colour sequence
Product : Lavaro
Colours : wit, grijs, orange, rood, geel

Paving P3 - Pedestrian crossing build outs 230m²
To pedestrian links and threshold area
Size: 200 x 600mm
Product: Lavaro
Colours: Grijs/Rood, Grijs

Paving P4 - High Quality paving 451m²
Pedestrian build outs
Various sizes sizes and finishes to create patterned paving feature. Indicative sizes:
Pattern Type 1: Herringbone
Size: 50 x 200
Finish/colour: Breccia & Liscio - Tagenta E
Pattern Type 2: stacked bond
Size: 200 x 800

HAZARD PAVING

Mortar/bedding and sub bases as above

Tramline hazard paving
To shared surface pedestrian crossings
2.4m wide; 4m wide typically
400 x 400 x 50thick units
30mm bedding & narrow pointed resin mortar

Blister hazard block paving
To pedestrian road crossings
200 x 133 x 60 thick

Directional hazard paving
Adjacent flush surface car parking

BOUND SURFACE

Surface B1 1671m²
In-situ concrete surface 1 - Buff finish
Re-inforced in-situ concrete surface with exposed aggregate to match in-situ concrete surface to Porth Eirias and Phase 1b developments. Includes bands of contrasting colour aggregates.

Surface B1A 369m²
In-situ concrete surface 3 - Grey finish
As above

Surface B2 - HRA for Pedestrian Zones
New 20mm HRA surface course; Build-up course to MML drawings
A. Shared surface 3312m²
B. Activity Zones and links 1163m²
C. Pavement reinstatement 113m²

Surface B3 - HRA for Vehicular Zones 6679m²

Surface B4 - Coloured Asphalt
ULTICOLOUR HRA surface course

A. Flush pedestrian road crossing 84m²
*40mm thick **UnltiColour HRA** surface course.*
Colour: Natural Quartz; 10mm, PSV 57

B. *Play activity areas* 165m²
Planed existing road surface to required levels.
*20mm thick **UnltiColour HRA** surface course*
Colour: Orange; 6mm; PSV 53

ARTWORK

Health Marker - as per previous phases
3m long granite blocks @ 50m intervals, with etched and inset artwork. 3m long x 500mm wide x100mm deep blocks. Each marker is made up of 3 sections

Granite artwork 'Postcards' - as per previous phase
Size: 1.5m x 1m x 100mm thick max. granite with inset (supplied by specialist).
Quantity TBC by CCBC

TBC Surface artwork treatment to selected areas.
Product : Decomark - preformed thermoplastic sheets; applied to bound surfaces
Artwork design to be confirmed following further consultations

Rhos Gateway feature
Indicative location around edge of Combermere Gardens. Final design subject to further consultation and to be submitted as a separate planning application

Revision	Description	By	On
P 1	PLANNING ISSUE	HR	26/08/2021

FURNITURE ELEMENTS - GENERAL

Raised planter edges
Raised planters composed of granite seating edge and/or 'Staple' raised metal planter edge by *logic-bespoke*. Maximum height above finished level: 450mm

Planter Types
Type A: Rectangular raised planter
2 sides granite seating edge ; 2 sides metal edge
Type B: Rectangular raised planter
3 sides granite seating edge ; 1 sides metal edge
Type C: Irregular shapes
Metal edge only

VEHICLE CONTROL

r-b Cornwall Bollard Removable
Manufacturer: Marshalls
Product reference: Cornwall Bollard Removable
(1098mm high above ground; 1398mm high overall)
Material: Ferrocast
Fixing: Removable; To be confirmed by manufacturer;

b Cornwall Bollard Root Fixed
Manufacturer: Marshalls
Product reference: Cornwall Bollard Root Fixed
(1098mm high above ground; 1398mm high overall)
Material: Ferrocast
Fixing: Below ground installation; To be confirmed by manufacturer;

CYCLE FACILITIES

CS Sheffield Cycle Stand
Manufacturer: Marshalls
Product reference: Sheffield Ferrocast Cycle Stand
(750mm wide; 800mm high above ground; 1100mm high overall)
Material: Ferrocast
Fixing: Root fixed

Bike repair station with integrated pump
Supplier: Turvec Solutions Ltd.
Dimensions: 440mm (w) x 300mm (d) x x1440mm (h)
Finish: Powder Coated . RAL colour TBC
Fixing: Surface mounted on baseplate

RAILINGS AND EDGE PROTECTION

R1 Railing Type R1
'Harbour Style' 1.15m high, 2- rail & 3-rail system.
To replace existing steps railings and new to top of slipway
(Ferrocast) Colour: RAL 1013 Oyster White.
Supplier: Marshalls or Similar Approved
Surface fixed
Refer to drawings 100374-BCA-03-XX-DR-L-
0106 Railings and Edge Protection R1 - Harbour Style
0419 Railings R1 Typical Details - Harbour Style

R2 Railing Type R2
V4 pedestrian railings: 1.0m high.
Galvanised steel, powder coated finish
Fixed version (refer to Removable version along events space, to include ground sockets
Refer to drawings 100374-BCA-03-XX-DR-L-
0107 Railings and Edge Protection R2 - OptiRail
0420 Railings R2 Typical Details - OptiRail

R3 Railing Type R3 - Play Area
Loop Knee Rail: 600mm high, 1.5 - 2m long
50mm Ø Galvanised steel frame with 20mm Ø intermediate rail for 'play panel' fixing and support
Finish: marine grade powder coated finish

LITTER BINS

Nexus Litter Bins
Supplier: Glasdon or similar approved
Fixing: bolt fixed to concrete pad @ 70mm below surface and binder courses
Accessories as standard:
2no moulded plastic liners
Concrete foundation fixing bolts
Silver bin symbols
Nexus stubber plate - gun metal

Litter Bin 1 Nexus 360 Litter Bin
Litter Bin 2 Nexus 200 Litter Bin

PARKING:

Caley Promenade

Bottom of Caley Embankment	75no
Promenade Echelon	93no
Disabled parking	15no
Electric charger bay	15no

Rhos

Rhos residential area	20no
Rhos-on-Sea centre [6no parking]	
Standard parking	2no
Disabled parking	2no
Electric charger bay	2no
TOTAL	**224no**
Disabled parking total	17no [7.6%]
EV parking total	17no [7.6%]

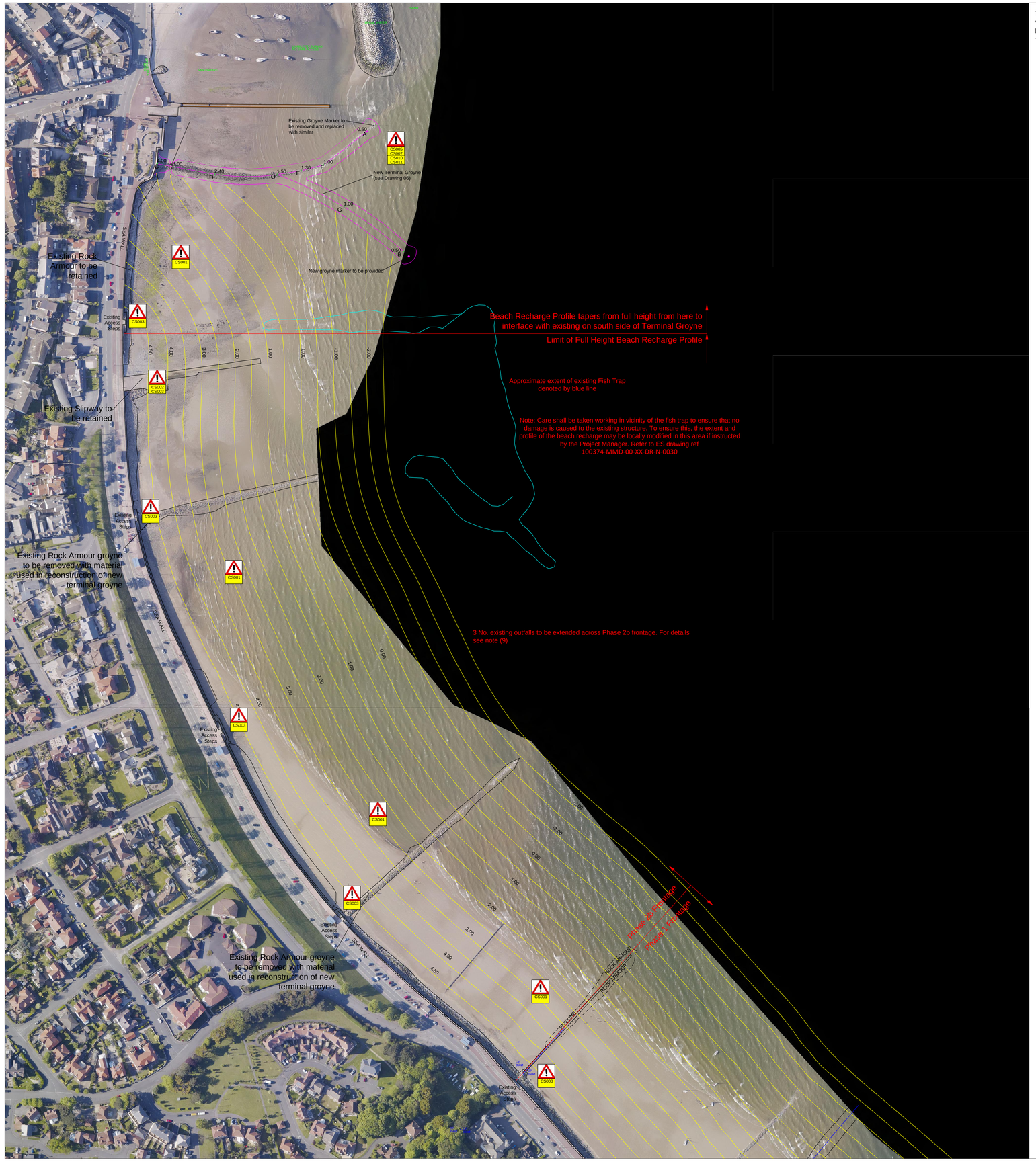
Refer to separate strategy drawings:
0102 - Street Furniture - Amenity
0103 - Street Furniture - Operational
0109 - Soft Landscape Strategy
0110 - Surfaces Strategy

Client	CCBC / Mott MacDonald	**Scale** 1:1000 @ A1	**Created by** HR	**Last edited by** RAZAK.H	**Date** July 2021	
Job title	Colwyn Bay Promenade Ph 2b	**Project number** 100374-BCA-03-XX-DR-L-		**Drawing no.** 0100	**Issue** P-01	**Checked** MO'C
Drawing title	General Arrangement					

PLANNING

19 OLD HALL STREET
LIVERPOOL
L3 9IQ
TELEPHONE +44 (0)151 242 6161
FACSIMILE +44 (0)151 236 4467
EMAIL office@bcalandscape.co.uk
WEB SITE www.bcalandscape.co.uk

BCA Landscape



The estimated quantity of sand to be imported to complete the works = 485,000m3, split approximately 335,000m3 across the Phase 2b frontage and 150,000m3 to top up the Phase 1 frontage.

SAFETY, HEALTH and ENVIRONMENTAL INFORMATION

The following residual hazards have been identified in the Designer's Hazard Register (ref Works Information)

CS001: Requirement for Regular Beach Management to limit wave overtopping of sea wall to acceptacle levels;

CS002: Potential for soft sand impeding access for disabled persons;

CS003: Potential for trip hazards arising from buried railings at access points;

CS005: Potential for siltation at harbour mouth requiring monitoring and clearance;

CS007: Requirement to warn public of dangers of gaining access on/over rock structures;

CS010: Maintenance of Navigation markers;

CS011: Movement of rocks to be monitored and moved/replaced as necessary

Notes

1. All levels are in metres and are relative to OD (Ordnance Datum). All dimensions in metres unless otherwise stated. Horizontal Control points are relative to the National Grid OSGB36;

2. This drawing shall be read in conjunction with all related drawings and Works Information. All discrepancies shall be referred to the Project Manager for decision before proceeding;

3. Do not scale from this drawing;

4. Volumes of sand to be imported shall be defined from comparison of the design profile with a survey of the beach applying prior to beach importation commencing, as Appendix 1/12;

5. Prior to the beach recharge commencing the Contractor shall carry out enabling works as follows:

- Removal of designated rock groynes and existing sea wall toe protection;
- Re-construction of the terminal rock groyne at Rhos-on-Sea;
- Re-placing of any surplus excavated rock along the toe of the sea wall, south of the existing Phase 2b slipway;
- Along the section where existing armour stone has been removed along the toe of the sea wall, the condition of the wall shall be ascertained and the Contractor shall, if required by the Supervisor, carry out repair works to the sea wall before recharge is carried out in that section;
- Concrete steps over the existing rock groynes to be removed shall be broken up and removed from site;
- Construction of outfall extensions and associated works, as detailed elsewhere.

6. Beach recharge work is to be carried out to the frontage consecutively, working from east to west, with work in any subsequent area not being carried out until work in the preceding area has been completed and accepted;

7. Completion and acceptance of each beach area shall not exceed lengths of 200 metres. Sequential completion of each area shall be in the same working order as the beach areas i.e. working from east to west;

8 The proposed seaward extent of beach recharge works is shown indicatively. The full seaward extent of the recharge works is to be determined by levels and gradients given on the beach cross section construction drawing.

9. Location of outfalls to be extended as part of the Works shown on Drawing No. 100374-MMD-01-XX-DR-D-0510.

10. Refer to ES document for inter-tidal working restrictions. Document ref 100374-MMD-00-XX-RP-N-0003.

LIST OF DRAWINGS

66-2010-01: Phase 2b - Existing Beach Arrangements

66-2010-02: Phase 1 - Existing Beach Arrangements

66-2010-03: Phase 2b - Proposed Beach Arrangements

66-2010-04: Phase 1 - Proposed Beach Arrangements

66-2010-05: Typical Beach Recharge Cross Section

66-2010-06: Rhos-on-Sea Terminal Groyne Modifications

REV	DETAIL	DRAWN	CHECKED	DATE
3	Notes Added	AJW	AD	25/08/21
2	Drawing List Added	AJW	AD	8/7/21
1	Notes amended; SHE information added	AJW	AD	6/7/21

PROJECT

Colwyn Bay Waterfront
Phase 2b Coastal Defences

TITLE

Phase 2b - Proposed Beach Arrangements

Coastal Engineering UK Ltd
26 Rhodesway, Wirral, CH61 0HG
Email: ceuk@coasteng.co.uk Tel: (0151) 558 1956

DRAWN BY:	CHECKED BY:	APPROVED BY:	APPROVAL DATE:
AJW	AD	NH	21/08/21

SCALE @ A0:	CAD File Ref:
1:1250	File: Phase 2b Layout.dwg Layout: 03 Phase 2b Proposed Beach Contours

PROJECT Ref:	DRAWING No:	REV
100374-CEUK	/ 66-2010-03-03-T	3

File: \\DISKSTATION\My Documents\CEC\SC\Clients\Mott McDonald\2010 Colwyn Bay Phase 2b\Outputs\ Phase 2b Layout.dwg Layout: 03 Phase 2b Proposed Beach Contours Date: Aug 25, 2021 17:41 User: ajlang

The estimated quantity of sand to be imported to complete the works = 485,000m3, split approximately 335,000m3 across the Phase 2b frontage and 150,000m3 to top up the Phase 1 frontage.

SAFETY, HEALTH and ENVIRONMENTAL INFORMATION

The following residual hazards have been identified in the Designer's Hazard Register (ref Works Information)

CS001: Requirement for Regular Beach Management to limit wave overtopping of sea wall to acceptacle levels;

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CS003: Potential for trip hazards arising from buried railings at access points;

CS005: Potential for siltation at harbour mouth requiring monitoring and clearance;

CS007: Requirement to warn public of dangers of gaining access on/over rock structures;

CS010: Maintenance of Navigation markers;

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Notes

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2. This drawing shall be read in conjunction with all related drawings and Works Information. All discrepancies shall be referred to the Project Manager for decision before proceeding;

3. Do not scale from this drawing;

4. Volumes of sand to be imported shall be defined from comparison of the design profile with a survey of the beach applying prior to beach importation commencing, as Appendix 1/12;

5. Prior to the beach recharge commencing the Contractor shall carry out enabling works as follows:

- Removal of designated rock groynes and existing sea wall toe protection;
- Re-construction of the terminal rock groyne at Rhos-on-Sea;
- Re-placing of any surplus excavated rock along the toe of the sea wall, south of the existing Phase 2b slipway;
- Along the section where existing armour stone has been removed along the toe of the sea wall, the condition of the wall shall be ascertained and the Contractor shall, if required by the Supervisor, carry out repair works to the sea wall before recharge is carried out in that section;
- Concrete steps over the existing rock groynes to be removed shall be broken up and removed from site;
- Construction of outfall extensions and associated works, as detailed elsewhere.

6. Beach recharge work is to be carried out to the frontage consecutively, working from east to west, with work in any subsequent area not being carried out until work in the preceding area has been completed and accepted

7. Completion and acceptance of each beach area shall not exceed lengths of 200 metres. Sequential completion of each area shall be in the same working order as the beach areas i.e. working from east to west;

8 The proposed seaward extent of beach recharge works is shown indicatively. The full seaward extent of the recharge works is to be determined by levels and gradients given on the beach cross section construction drawing;

9. Across the Phase 1 frontage where existing beach levels are above the design recharge profile, material is to be firstly re-distributed to areas where levels are below the design recharge profile. This will require some re-distribution of sediment from lower parts of the beach to areas higher up. Additional imported material is then to be used to top up levels to the design profile over the Phase 1 area.

10. Reprofiling of the beach east of the Pier is to be carried out in accordance with and under Conwy CBC's existing beach management marine licence.

LIST OF DRAWINGS

66-2010-01: Phase 2b - Existing Beach Arrangements

66-2010-02: Phase 1 - Existing Beach Arrangements

66-2010-03: Phase 2b - Proposed Beach Arrangements

66-2010-04: Phase 1 - Proposed Beach Arrangements

66-2010-05: Typical Beach Recharge Cross Section

66-2010-06: Rhos-on-Sea Terminal Groyne Modifications

REV	DETAIL	DRAWN	CHECKED	DATE
3	Notes Added	AJW	AD	25/8/21
2	Drawing List Added	AJW	AD	8/7/21
1	Notes amended; SHE information added	AJW	AD	6/7/21

PROJECT

Colwyn Bay Waterfront
Phase 2b Coastal Defences

TITLE

Phase 1 - Proposed Beach Arrangements

Coastal Engineering UK Ltd
26 Rhodesway, Wirral, CH61 0HG
Email: ceuk@coasteng.co.uk Tel: (0151) 558 1956

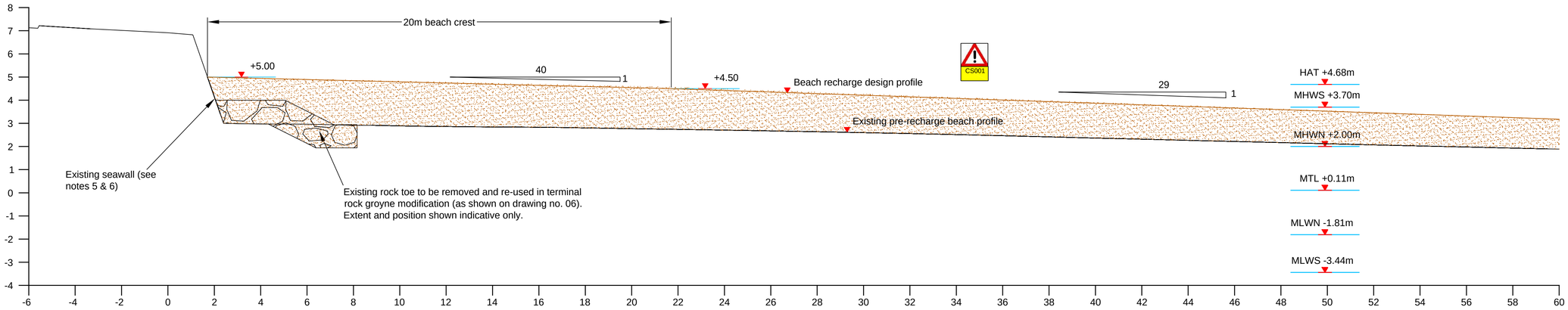
DRAWN BY:	CHECKED BY:	APPROVED BY:	APPROVAL DATE:
AJW	AD	NH	25/08/21

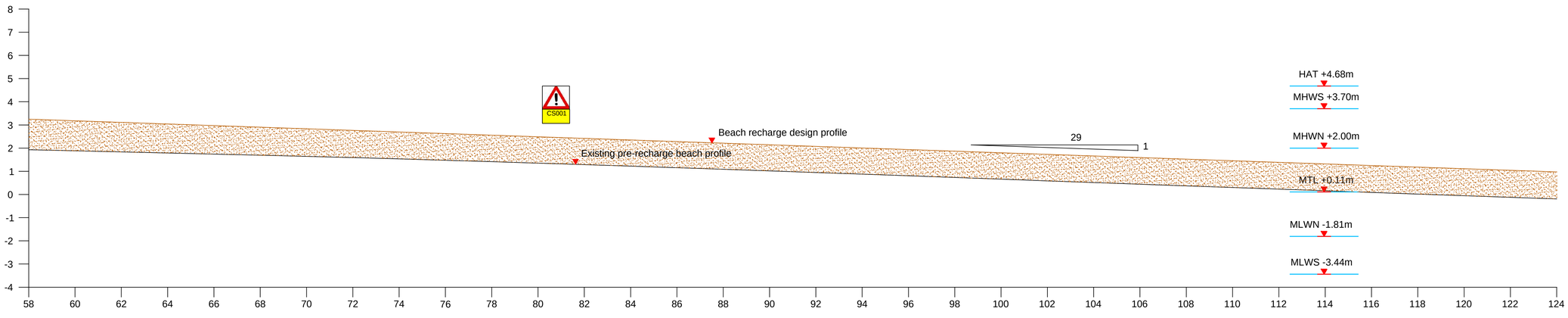
SCALE @ A0: 1:1250

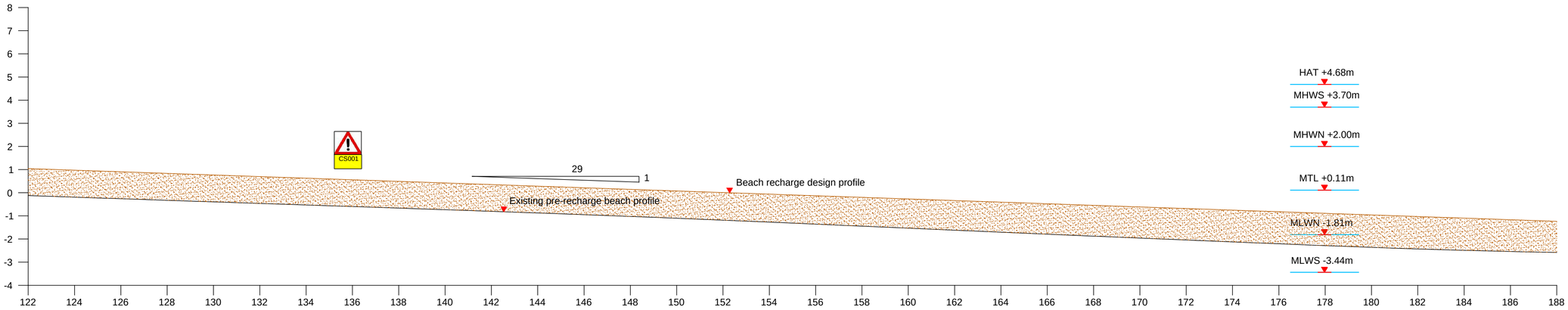
CAD File Ref:
File: Phase 2b Layout.dwg
Layout: 04 Phase 1 Proposed Beach Contours

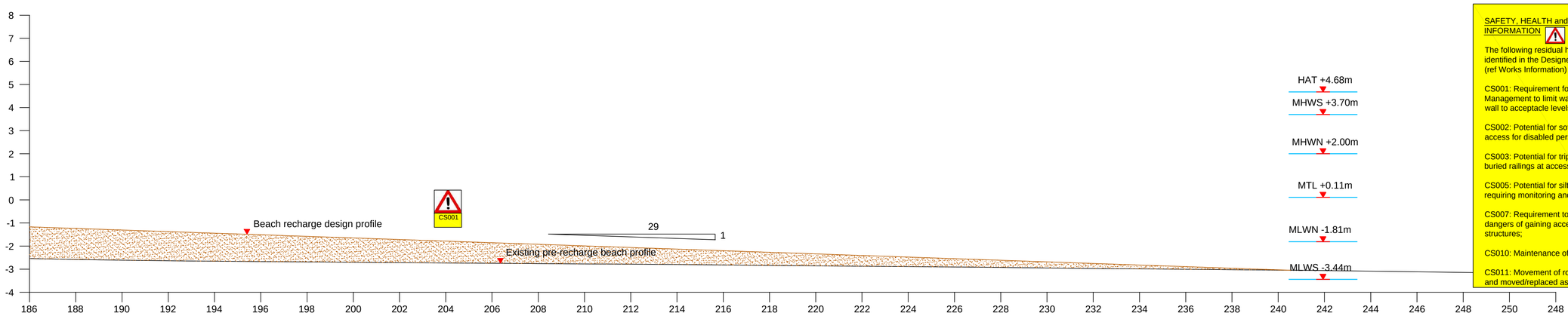
PROJECT Ref:	DRAWING No:	REV
100374-CEUK	/ 66-2010-04-03-T	3

File: \\DISKSTATION\My Documents\CECS\Clients\Mott MacDonald\2010 Colwyn Bay Phase 2b\Outputs\ Phase 2b Layout.dwg Layout: 04 Phase 1 Proposed Beach Contours Date: Aug 26, 2021 08:28 User: alanj









Notes

1. All levels are in metres and are relative to OD (Ordnance Datum). All dimensions in metres unless otherwise stated. Horizontal Control points are relative to the National Grid OSGB36.

2. Do not scale from this drawing.

3. Existing foreshore levels applying across the frontage vary and those shown, taken from a survey recorded July 2020, are indicative and not to be taken as representative at any specific point. Volumes of sand to be imported shall be defined from comparison of the above profile with a survey of the beach applying prior to beach importation commencing.

4. The recharge profile shown shall apply across the whoie Colwyn Bay frontage betwen the terminal groyne at Porth Eirias and the first set of steps south of the terminal groyne at Rhos-on Sea.Between the set of steps and the groyne the beach level shall fall from this profile to the existing beach level along the southerly flank of th groyne.

5. Representation of Armour Stone Blocks shown are schematic and do not specify or imply exact sizes, shapes or layers of stone to be excavated.

6. Structure setting out lines and levels to be established on site, following pre-commencement survey.

7. Prior to the beach recharge commencing the Contractor shall carry out enabling works as follows:

- Removal of designated rock groynes and existing se wall toe protection;
- Re-construction of the terminal rock groyne at Rhos-on-Sea;
- Re-placing of any surplus excavated rock along the toe of the sea wall, south of the existing Phase 2b slipway;
- Along the section where existing armour stone has been removed along the toe of the sea wall, the condition of the wall shall be ascertained and the Contractor shall, if instructed by the Supervisor, carry out repair works to the sea wall before recharge is carried out in that section;
- Concrete steps over the existing rock groynes to be removed shall be broken up and removed from site;
- Construction of outfall extensions and associated works, as detailed elsewhere.

LIST OF DRAWINGS

66-2010-01: Phase 2b - Existing Beach Arrangements

66-2010-02: Phase 1 - Existing Beach Arrangements

66-2010-03: Phase 2b - Proposed Beach Arrangements

66-2010-04: Phase 1 - Proposed Beach Arrangements

66-2010-05: Typical Beach Recharge Cross Section

66-2010-06: Rhos-on-Sea Terminal Groyne Modifications

SAFETY, HEALTH and ENVIRONMENTAL INFORMATION

The following residual hazards have been identified in the Designer's Hazard Register (ref Works Information)

CS001: Requirement for Regular Beach Management to limit wave overtopping of sea wall to acceptacle levels;

CS002: Potential for soft sand impeding access for disabled persons;

CS003: Potential for trip hazards arising from buried railings at access points;

CS005: Potential for siltation at harbour mouth requiring monitoring and clearance;

CS007: Requirement to warn public of dangers of gaining access on/over rock structures;

CS010: Maintenance of Navigation markers;

CS011: Movement of rocks to be monitored and moved/replaced as necessary

REV	DETAIL	DRAWN	CHECKED	DATE
2	Drawing List Added	AJW	AD	8/7/21
1	Notes amended; SHE information added	AJW	AD	6/7/21

PROJECT

Colwyn Bay Waterfront
Phase 2b Coastal Defences

TITLE

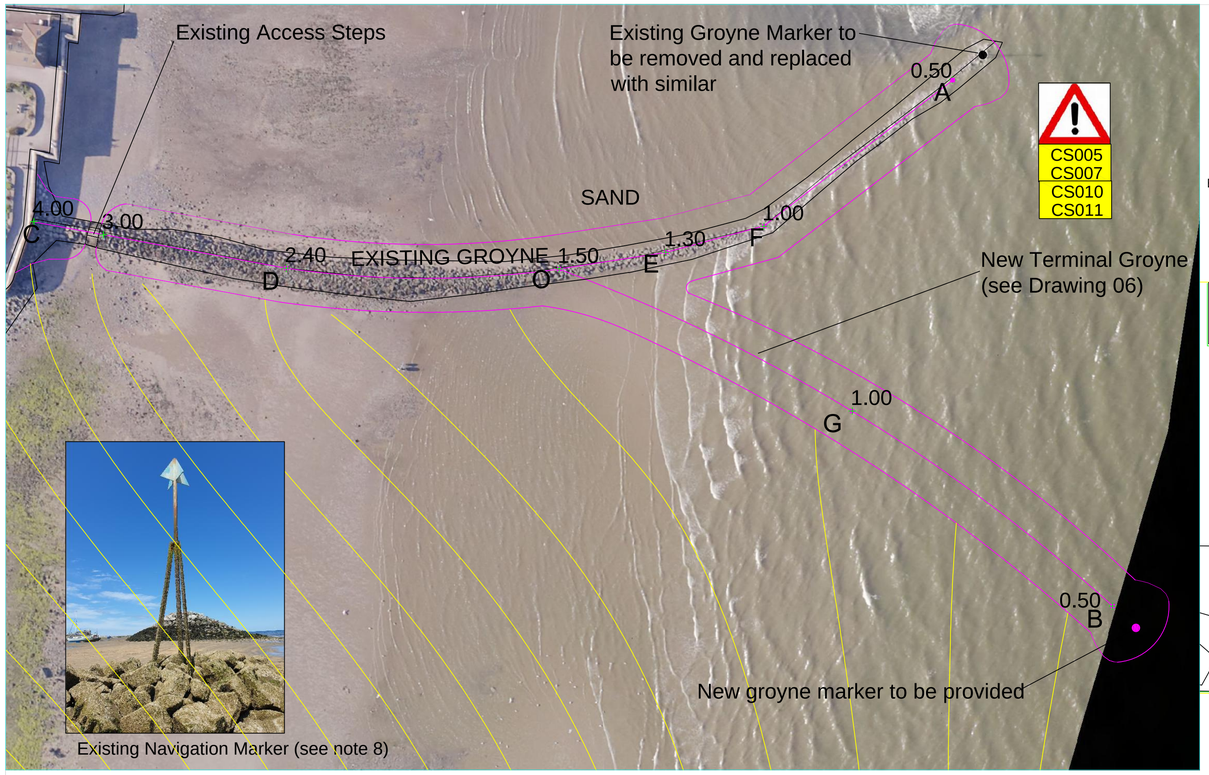
Typical Beach Recharge Cross Section

Coastal Engineering UK Ltd
26 Rhodesway, Wirral, CH61 0HG
Email: ceuk@coasteng.co.uk Tel: (0151) 558 1956

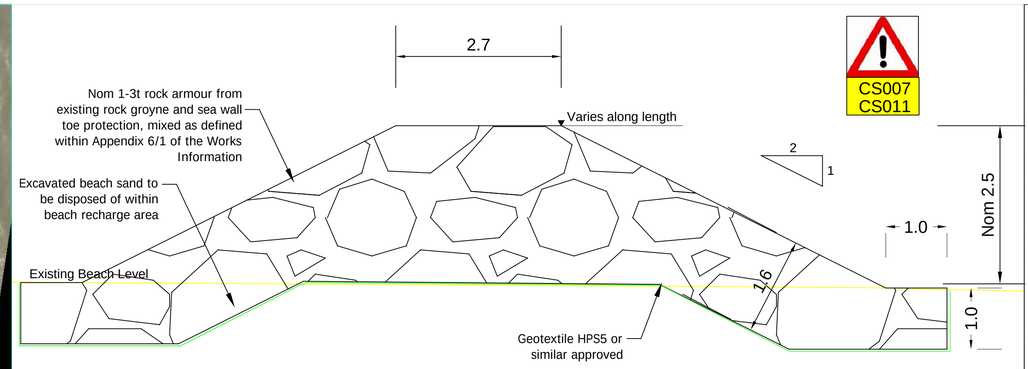
DRAWN BY:	CHECKED BY:	APPROVED BY:	APPROVAL DATE:
AJW	AD	NH	08/07/21

SCALE @ A1:	CAD File Ref:
1:100	File: Phase 2b Layout.dwg Layout: 05 Beach Recharge Typical Section

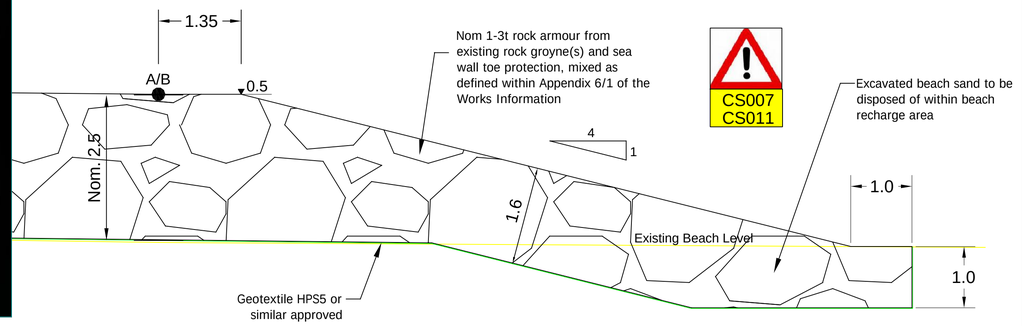
PROJECT Ref:	DRAWING No:	REV
100374-CEUK	/ 66-2010-05-02-T	2



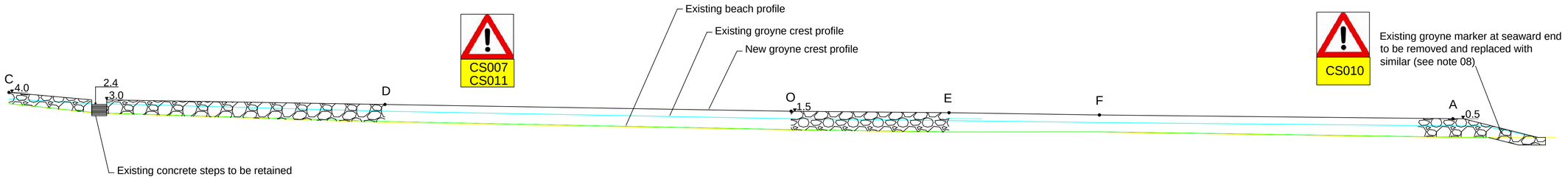
Groyne Layout Plan
Scale 1:600



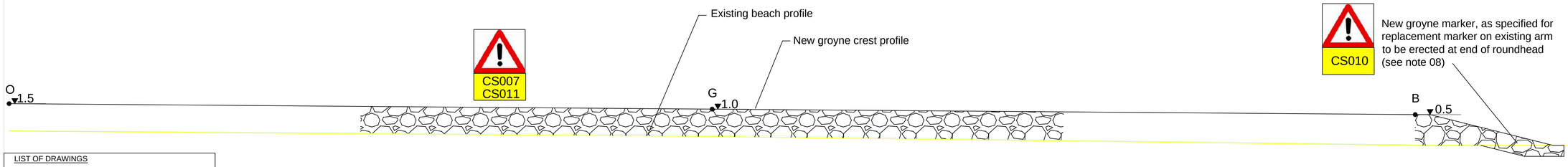
Typical Groyne Cross Section
Scale 1:50



Groyne Roundhead Detail
Scale 1:50



Groyne Long Section - Existing Arm
Scale 1:300



Groyne Long Section - New Arm
Scale 1:200

LIST OF DRAWINGS

66-2010-01: Phase 2b - Existing Beach Arrangements

66-2010-02: Phase 1 - Existing Beach Arrangements

66-2010-03: Phase 2b - Proposed Beach Arrangements

66-2010-04: Phase 1 - Proposed Beach Arrangements

66-2010-05: Typical Beach Recharge Cross Section

66-2010-06: Rhos-on-Sea Terminal Groyne Modifications

Notes

1. All levels are in metres and are relative to OD (Ordnance Datum). All dimensions in metres unless otherwise stated. Horizontal Control points are relative to the National Grid OSGB36;

2. Do not scale from this drawing;

3. Existing foreshore levels applying across the frontage vary and those shown, taken from a survey recorded July 2020, are provided for guidance only;

4. Representation of Armour Stone Blocks shown are schematic and do not specify or imply exact sizes, shapes or layers of stone to be excavated or placed;

5. Structure setting out lines and levels to be established on site, following pre-commencement survey, as Appendix 1/12;

6. Existing groyne to be removed and re-constructed in sections, as note 7 below and material stockpiled for re-use prior to new sections of groyne being constructed;

7. New groyne construction to be carried out sequentially as follows:
   * New wave arm OB;
   * Existing arm OA;
   * Shore link arm OC.

Construction shall commence at the seaward end of each section and proceed in a single working face to completion

8. The existing navigation marker comprises a 125mm dia CHS, supported by twin 100mm x 100mm x 6mm steel angle section with bolted connections. The structure is founded on a concrete block located within the exiting armour stone. The existing marker is to be replaced with a similar beacon in the same location and a new marker is to be provided at the seaward end of the new arm. The top mark is to be replaced with a prefabricated Sealite Starboard Hand Top Mark Ref SI-TM1-SH-A. The underside of the topmark shall be set at a minimum level of +6.60m ODN.

SAFETY, HEALTH and ENVIRONMENTAL INFORMATION

The following residual hazards have been identified in the Designer's Hazard Register (ref Works Information)

CS001: Requirement for Regular Beach Management to limit wave overtopping of sea wall to acceptacle levels;

CS002: Potential for soft sand impeding access for disabled persons;

CS003: Potential for trip hazards arising from buried railings at access points;

CS005: Potential for siltation at harbour mouth requiring monitoring and clearance;

CS007: Requirement to warn public of dangers of gaining access on/over rock structures;

CS010: Maintenance of Navigation markers;

CS011: Movement of rocks to be monitored and moved/replaced as necessary

REV	DETAIL	DRAWN	CHECKED	DATE
3	Notes amended	AJW	AD	25/8/21
2	Drawing List Added	AJW	AD	8/7/21
1	Notes amended; SHE information added	AJW	AD	6/7/21

PROJECT

Colwyn Bay Waterfront
Phase 2b Coastal Defences

TITLE

Rhos-on- Sea Terminal Groyne Modifications

Coastal Engineering UK Ltd
26 Rhodesway, Wirral, CH61 0HG
Email: ceuk@coasteng.co.uk Tel: (0151) 558 1956

DRAWN BY:	CHECKED BY:	APPROVED BY:	APPROVAL DATE:
AJW	AD	NH	25/08/21

SCALE @ A1:	CAD File Ref:
As Shown	File: Phase 2b Layout.dwg Layout: 06 Rock Groyne Arrangements

CONWY CYNGOR BWRDEISTREF SIROL COUNTY BOROUGH COUNCIL

MOTT MACDONALD

PROJECT Ref:	DRAWING No:	REV
100374-CEUK	/ 66-2010-06-03-T	3

Appendix 9.2 – Species Specific Legislation

MOTT MACDONALD

Colwyn Bay Waterfront Project Phase 2b

Appendix 9.2 - Species Specific Legislation

August 2021

Mott MacDonald
Mott MacDonald House
5 Woodland Road West
Colwyn Bay LL29 7DH
United Kingdom

T +44 (0)1492 534601
mottmac.com

Environment Roads & Facilities
Conwy County Borough Council
Mochdre Council Offices

Colwyn Bay Waterfront Project Phase 2b

Appendix 9.2 - Species Specific Legislation

August 2021

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
P01	August 2021	A.J	N.S	N.H	First issue

A. Species Specific Legislation

A.1.1 The information in this Appendix relates to species assessed within this document as being potentially affected by the proposed works and is a summary only. The legislation referred to in this Appendix should be referred to for the full text.

Overwintering and Breeding Birds

In the UK all wild birds, their nests and their eggs are protected by the Wildlife and Countryside Act 1981[1] (as amended) (the '1981 Act').

Offences under this Act include:

- Intentionally killing, injuring or taking any wild bird;
- Intentionally taking, damaging or destroying the nest of any wild bird whilst it is in use or being built; and,
- Intentionally taking or destroying the egg of any wild bird.

Birds listed on Schedule 1 of the 1981 Act have further protection making it an offence to:

- Intentionally or recklessly disturb any wild bird listed on Schedule 1 whilst it is nest building, or at/near a nest containing eggs or young; and,
- To disturb the dependent young of such a bird.

A total of 51 bird species are listed as Priority Species for conservation under Section 7 of the Environment (Wales) Act 2016[2] (the '2016 Act') These species are targeted with measures necessary to support their conservation status in the Wales (and the UK) and particular care must be taken to avoid adverse impacts.

Terrestrial Invertebrates

A.1.2 A total of 188 invertebrate species, including a range of moth, butterfly, and bee species, are listed as Section 7 Priority Species under the 2016 Act[2]. A range of species including species of beetle, butterfly, moth and spider and included under Schedule 5 of the 1981 Act.

Flora

A.1.3 A series of plant species, including the Small-flowered catchfly, are listed as a Section 7 Priority Species under the 2016 Act[2]. These habitats should be protected, restored and / or enhanced wherever possible.

Notable Habitats

A.1.4 A series of marine habitats are included as Priority Habitats under the 2016 Act[2]. Blue Mussel beds, *Sabellaria alveolata* reef and Coastal vegetated shingle are all Section 7 Priority Habitats. These habitats should be protected, restored and / or enhanced wherever possible.

Marine mammals

A.1.5 All cetacean species are protected in the UK under the Conservation of Habitats and Species Regulations 2017 (as amended), Section 9(4)a of the 1981 Act and the Conservation of

[1] The Wildlife and Countryside Act 1981 [online] Available at http://www.legislation.gov.uk/ukpga/1981/69

[2] Environment (Wales) Act, 2016. [online] Available at: Wales Biodiversity Partnership - Environment (Wales) Act (biodiversitywales.org.uk)

Offshore Marine Habitats and Species Regulations (2017) (from 12 to 200 nautical miles). This makes it illegal to:

- Deliberately capture, kill or injure;
- Deliberately disturb;
- Deliberately damage or destroy place of breeding or resting; and
- Intentionally or recklessly disturb any dolphin, whale or basking shark.

Fish

A.1.6 The following species are all Section 7 Priority Species under the 2016 Act[2]:

- River lamprey;
- Sea lamprey;
- Herring;
- Cod;
- Whiting;
- Plaice;
- Sole;
- Atlantic salmon; and
- Brown/ Sea trout.

Benthic Invertebrates

A.1.7 *Sabellaria alveolata* reefs and Blue mussel beds are a Section 7 priority habitat in Wales. These polychaete worms themselves are not protected, but the biogenic reefs they create are listed as an Annex I habitat by the Habitats Directive (92/43/EEC).

A.1.8 The Sea Fisheries (Shellfish) Act 1976[3] (as amended) sets out to protect shellfish stocks including crustaceans and molluscs:

- Ability to make orders for shellfish;
- Regulations on the taking and sale of certain crabs and lobsters (including preventing the selling of egg-bearing of soft-shelled edible crab).

A.1.9 The Sea Fisheries (Shellfish) Act 1976[4] (as amended) sets out to protect shellfish stocks including crustaceans and molluscs:

- Ability to make orders for shellfish;

Regulations on the taking and sale of certain crabs and lobsters (including preventing the selling of egg-bearing of soft-shelled edible crab).

Bats

A.1.10 All bat species are protected under the 1981 Act and the Conservation of Habitat and Species Regulations 2017 (as amended). This means it is illegal to intentionally or deliberately kill, injure, disturb or capture these species or damage, destroy or obstruct access to any structure, breeding or resting place used by them.

A.1.11 There are eight bat species included as Section 7 Priority species under the 2016 Act; barbastelle (*Barbastella barbastellus*), Bechstein's bat (*Myotis bechsteinii*), noctule (*Nyctalus noctula*), common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus*

[3] The Sea Fisheries (Shellfish) Act, 1967. [online] Available at: http://www.legislation.gov.uk/ukpga/1967/83/contents
[4] The Sea Fisheries (Shellfish) Act, 1967. [online] Available at: http://www.legislation.gov.uk/ukpga/1967/83/contents

pygmaeus), brown-long eared bat (*Plecotus auritus*), greater horseshoe bat (*Rhinolophus ferrumequinum*) and lesser horseshoe bat (*Phinolophus hipposideros*). All bat species are included as EPS.

Appendix 9.3 – Preliminary Ecological Appraisal Report

MOTT MACDONALD

Colwyn Bay

Preliminary Ecological Appraisal Report

July 2020

Mott MacDonald
Mott MacDonald House
5 Woodland Road West
Colwyn Bay LL29 7DH
United Kingdom

T +44 (0)1492 534601
mottmac.com

Conwy County Borough
Council Environment,
Roads & Facilities
Swyddfeydd Mochdre,
Ffordd Conway,
Mochdre,
Bae Colwyn,
LL28 5AB

Colwyn Bay

Preliminary Ecological Appraisal Report

July 2020

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Contents

Executive summary

Mott MacDonald Limited has been commissioned by Conwy County Borough Council (CCBC) to complete a Preliminary Ecological Appraisal for two coastal defence and promenade improvement Schemes within Colwyn Bay, north Wales. The Victorian built coastal defences around Colwyn Bay from Rhos-on-Sea in the west to Old Colwyn in the east have suffered from undermining, corrosion, partial collapses and degradation with frequent overtopping events occurring at Spring Tides. Phase 1abc and 2a of the Colwyn Bay Waterfront Project have already been completed which included the construction of a 150m groyne and Porth Eirias, beach recharge and promenade improvements in the central Colwyn Bay area. Subsequent to this, CCBC are now seeking to provide a permanent upgrade of the coastal defences to protect the western and eastern areas of the bay concurrently with improvements to the promenade to facilitate active travel and regeneration. These proposed schemes are 'Colwyn Bay Waterfront Project Phase 2b' to the west and 'Old Colwyn Coastal Defence and Active Travel Scheme' to the east. The proposed works will include upgrades to the promenade, new costal defences and beach recharge.

A desk-based assessment identified seven Statutory Designated sites within 2.0km and three non-statutory designations within 1.0km of the survey area. The closest and most relevant is the Liverpool Bay Special Protection Area (SPA) and Important Bird Area (IBA), located 45m north of the survey area, designated for important wading bird species. An assessment of the birds identified, and potential impacts is included within the Overwintering Bird Report (Mott MacDonald Limited, 2020). Due to the close proximity of this designation, a Habitats Regulations Assessment (HRA) screening is required for the scheme along with an application for a marine licence for the works. The nearest non-statutory designation is Coed Rhos Fossil Woodland, located in the west of the survey area. It is designated for its geological features and therefore not considered within the scope of this assessment. Other non-statutory designations are located over 0.6km away.

The survey area itself largely supports habitats of low ecological value save for the priority habitats 'Subtidal sand and gravels', '*Sabellaria alveolata* Reefs' (Honeycomb worm) and 'Blue mussel beds on sediment'. Further assessment for these habitats is recommended once the exact scope of works is finalised. However, based on the proposals, it is anticipated that the subtidal sand and gravels would be unaffected (beach recharge would add to this habitat) provided the sand was sourced from local areas. The *Sabellaria alveolata* Reefs' could be damaged during construction activities or affected by changes to water quality / turbidity. In terms of the mussel beds, there are two mussel beds in the survey area (one within the west and one in the east), both on sand, which are in poor condition. The mussel bed in the west would be lost under the beach recharge works. Mussel beds are also known to be present beyond the survey area (at the toe of the groynes in the west) which could be affected by increased sediment and turbidity, albeit this would be temporary. Recommendations have been included in respect of these.

The survey area is considered to have habitats suitable to support roosting bats (two structures, namely a shelter and toilet block, both low potential), foraging bats (under street lights), badger, other mammals, nesting birds, overwintering and foraging birds (assessed in Mott MacDonald Limited, 2020), reptiles, fish and marine invertebrates. Based on the proposed scope of works, recommendations are included in the form of further survey and assessment, construction safeguards, design of landscaping and retention of habitats. Opportunities for enhancement have been highlighted.

1 Introduction

1.1 Background and Site Location

Mott MacDonald Limited has been commissioned by Conwy County Borough Council (CCBC) to complete a Preliminary Ecological Appraisal for two coastal defence and promenade improvement schemes within Colwyn Bay, north Wales (see Map 1).

Map 1: Colwyn Bay Location

Source: DigitalGlobe, Microsoft, Earthstar Geographics | Esri UK, Esri, HERE, Garmin, METI/NASA, USGS

The Victorian built coastal defences around Colwyn Bay from Rhos-on-Sea in the west to Old Colwyn in the east have suffered from undermining, corrosion, partial collapses and degradation with frequent overtopping events occurring at Spring Tides.

Phase 1abc and 2a of the Colwyn Bay Waterfront Project have already been completed which included the construction of a 150m groyne and the Porth Eirias beach recharge and promenade improvements in the central Colwyn Bay area.

Subsequent to this, CCBC are now seeking to provide a permanent upgrade of the coastal defences to protect the western and eastern areas of the bay concurrently with improvements to the promenade to facilitate active travel and regeneration.

These proposed schemes are illustrated on Map 2 (along with the Phase 1 area), namely:

- 'Colwyn Bay Waterfront Project Phase 2b' to the west; and
- 'Old Colwyn Coastal Defence and Active Travel Scheme' to the east.

These will be referred to as the Schemes within this report. These are the two areas targeted by the Preliminary Ecological Appraisal albeit the intervening area has been mapped for completeness.

Map 2: Scheme Location within Colwyn Bay

Source: 'ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community'. Note The completed Colwyn Bay Waterfront Phase 2a Scheme area straddles the Phase 1 and Phase 2 areas.

The national grid references for the western and eastern boundaries of each Scheme are approximately:

- The Colwyn Bay Waterfront Project Phase 2b west (285746, 378889) to east (287079, 378699); and
- Old Colwyn Coastal Defence and Active Travel Scheme west (284270, 380524) to east (284975, 379499).

1.2 Proposed Scope of Coastal and Promenade Works

1.2.1 Old Colwyn Coastal Defence and Active Travel Scheme

The proposed scope of work comprises a combination of coastal defence, promenade and active travel improvements:

Coastal defence improvements include:

- The construction of a rock revetment approximately 32m in cross-sectional width and 1.15km in length, with associated modifications to existing surface water outfalls on the beach to extend them through the new revetment;

- A new access build-out area to be constructed in the western half of the Scheme area which would have several functions, including providing a greater area for pedestrian access; Equality Act compliant ramp access and stepped access to the beach, along with landscaped seating steps at varying levels, to the beach access;
- New pedestrian accesses through the proposed revetment to comprise three sets of beach access steps perpendicular to the linear rock revetment;
- A dedicated fishing platform in the Splashpoint Area to keep anglers at a safe distance from active travel routes: and
- The raising of the Promenade to the west of Rotary Way and the raising of the Promenade and highway to the east of Rotary Way with associated access provision.

Active Travel improvements, to include new cycleway layouts, improved pedestrian access areas, improved lighting, new handrailing, improved picnic and outdoor spaces, improved signage and landscaping.

In addition, a series off ecological and educational enhancements have been incorporated into the proposals including new intertidal habitat creation, classification of the beach as a plastic free zone, incorporation of wildflower grassland into new amenity areas and enhancements to the network rail embankment.

1.2.2 Colwyn Bay Waterfront Project Phase 2b

The proposed scope of work is anticipated to comprise a combination of coastal defence and promenade improvements. The scope has not been finalised, however it is considered likely that the majority of the following aspects will be incorporated:

- Coastal defence works to comprise (from Horizon Shine to the southern boundary of Rhos-on-Sea Harbour):
  - Beach recharge to bring beach levels adjacent to the promenade up to those in the Phase 1 area; and
  - Modifications to the rock groyne adjacent to Rhos-on-Sea Harbour.
- Coastal defence works to comprise (from Rydal Boat store to the southern boundary of Rhos-on-Sea Harbour):
  - Repairs to the existing sea wall;
  - Removal of remaining areas of existing rock revetment located against the sea wall in recharge areas for re-use elsewhere; and
  - Modification of outfalls as appropriate to enable them to continue operating with the raised beach levels.
- Promenade improvement works currently anticipated to comprise (from Rydal Boat store to the southern boundary of Rhos-on-Sea Harbour):
  - 4.0m wide shared surface, 2.2m wide pedestrian only zone, highway alterations (one-way system), activity zones (for example seating, exercise areas, play features and garden areas), junction realignments, pedestrian links and crossings, new kiosks, planting and artwork.

1.2.3 Future Maintenance

The Schemes are also anticipated to also include future management and maintenance actions comprising:

- Maintenance and repair of coastal structures and sea wall;

- Maintenance and repair of promenade and associated features;
- Beach management;
- Reworking of structures to maintain the standard of service in line with sea level rise; and
- Beach re-nourishment if considered necessary (Colwyn Bay Waterfront project Phase 2b only).

1.2.4 Proposed Works Programme

As funding is yet to be secured for Scheme construction, the programme has not yet been confirmed. Due to the scale and funding requirements of the Schemes, the construction process may need to be split into several phases.

1.3 Purpose of this Report

The purpose of this report is to;

- Provide an initial appraisal of the ecological importance of the habitats in the areas relevant to the proposed works for the Scheme; and
- Provide an assessment of the potential for these areas to support protected ecological features and species.

This Preliminary Ecological Appraisal Report (PEAR) has been prepared in accordance with Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines.

The aims of this assessment are to:

- Carry out a Phase 1 Habitat survey (Joint Nature Conservation Committee (JNCC), 2010) to provide a description of the existing broad habitat types. To establish the presence or potential presence of any protected or notable species. The results of these surveys are presented in drawing form (Appendix A);
- To assess if the marine habitat has changed since Countryside Council for Wales (CCW) (now Natural Resources Wales) Marine Phase 1 was mapped previously;
- Undertake a desk-top study to identify any existing information regarding protected or notable species and sites with a nature conservation designation within the zone of influence (ZoI) of the survey area;
- Produce a report outlining any ecological constraints to the proposed development in terms of designated sites, habitats and/or protected and notable species:
- Provide a preliminary assessment of the potential for structures within the Scheme to support roosting bats;
- Provide recommendations for further ecological survey work, if considered necessary to inform an ecological baseline for the survey area;
- Identify any high-level mitigation or compensation measures that may be required to offset potential development impacts; and
- Identify opportunities for enhancement in line with national and local planning policy.

2 Legislation Context and Policy Framework

2.1 Legislation and National Planning Policy

The key legislation relating to ecology and the environment is the Wildlife and Countryside Act (WCA) 1981, as amended, which implements the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and Council Directive 79/409/EEC on the Conservation of Wild Birds (Birds Directive) in Great Britain. The WCA is complemented by the Conservation of Habitats and Species Regulations 2017 (CHSR, 2017), which implements Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive). The Regulations provide for the designation and protection of 'European sites', and the protection of 'European protected species'. The species and habitats listed by these measures are legally protected to varying degrees through the WCA. Together, the WCA and CHSR 2017 form the precedent for species and habitat protection in England and Wales.

- At national level, Chapter 6 of Planning Policy Wales (PPW), 2018 (which relates to conserving and enhancing the natural environment) requires Local Authorities (LA) to take measures to: Promote the conservation of landscape and biodiversity, in particular the conservation of native wildlife and habitats;
- Ensure that actions in Wales contribute to meeting international responsibilities and obligations for the natural environment;
- Ensure that statutorily designated sites are properly protected and managed;
- Safeguard protected species; and
- Promote the functions and benefits of soils, and in particular their function as a carbon store.

Developers must ensure that they comply with the above legislation by fully assessing the potential impacts on protected species and habitats from the proposed development. Where planning permission is required, this assessment must be finalised prior to and included with the submission of the planning application and the proposals should also be in compliance with relevant planning policy. The Planning Authority can the ensure that the necessary protected species and habitats information has been provided to inform an assessment and that proposals are in full accordance with relevant legislation and policy.

Under the Environment (Wales) Act 2016 public bodies, including Local Authorities are required 'to seek to maintain and enhance biodiversity in Wales' when carrying out their normal functions. Under Section 7, a list of species and habitats of 'principle importance to the conservation of biodiversity in Wales' was drawn up which acts as an aid to guide public bodies in implementing their duty. The Local Authority must consider the impact of the proposed works on protected habitats and species.

2.2 Local Development Plan

At a local level, planning policies are set out within 'Conwy Local Development Plan' (Adopted October 2013). Supplementary documentation is in the form of 'Topic Paper 6: Natural Environment' (2018).

Three policies are of relevance to ecology:

- Policy NTE/1 – The Natural Environment;
- Policy NTE/3 – Biodiversity; and
- Policy NTE/5 – The Coastal Zone.

Policy NTE/1 states that:

"In seeking to support the wider economic and social needs of the Plan Area, the Council will seek to regulate development so as to conserve and, where possible, enhance the Plan Area's natural environment, countryside and coastline. This will be achieved by:

- Safeguarding the Plan Area's biodiversity, geology, habitats, history and landscapes through the protection and enhancement of sites of international, national, regional and local importance, in line with Policy DP/6 – 'National Planning Policy and Guidance';
- Using Green Wedges and settlement boundaries to control the identity of individual settlements, to prevent coalescence and to protect the immediate landscape surrounding urban areas in line with Policy NTE/2 – 'Green Wedges and Meeting the Development Needs of the Community';
- Where appropriate and necessary, improving the quality of statutory and non-statutory landscapes and areas of biodiversity value affected by development, through management agreements, habitat connectivity, improved planting, landscape and maintenance specifications, in line with the Development Principle Policies and Policy NTE/3 – 'Biodiversity';
- Working with developers to safeguard protected species and enhance their habitats in line with Policies DP/6 and NTE/3;
- Respecting, retaining or enhancing the local character and distinctiveness of the individual Special Landscape Areas in line with Policy NTE/4 – 'The Landscape and Protecting Special Landscape Areas' and as shown on the Proposals Map;
- Protecting the Coastal Zone in line with Policy NTE/5 – 'The Coastal Zone'; and
- Preventing, reducing or remedying all forms of pollution including air, light, noise, soil and water, in line with Policy DP/6."

Policy NTE/3 states that:

- "New development should aim to conserve and, where possible, enhance biodiversity through:
  - Sensitive siting; avoiding European protected sites or those of national or local importance;
  - Sensitive layout and design which avoids impacts or mitigates through an agreed programme for any identified adverse impact on biodiversity;
  - Creating, enhancing and managing wildlife habitats and natural landscapes including connectivity;
  - Integrating biodiversity measures into the built environment;
  - Contributing to achieving targets in the Conwy Local Biodiversity Action Plan (LBAP);
  - Providing for a management agreement with the Local Planning Authority to secure the retention and long-term future of biodiversity interests where applicable.
- All proposals should include a Biodiversity Statement detailing the extent of impact on biodiversity.
- The Council will refuse proposals which would have a negative impact on a European Site, protected or priority species or habitat unless the impact is adequately mitigated,

and appropriate remediation and enhancement measures are proposed and secured by planning conditions or obligations."

Policy NTE/5 states that:

"A Coastal Zone is defined on the Proposals Map. Development in the Coastal Zone, outside settlement boundaries, will only be permitted where the development:

- Specifically requires a coastal location;
- Does not adversely affect the open character of the zone;
- Does not adversely affect the nature conservation value of the zone with any effects identified mitigated for;
- Does not detract from the tourism value or facilities;
- Does not interfere with natural coastal processes;
- Does not impede the function of any existing coastal defence structures;
- Accords with the Development Principles of the Plan."

3 Methodology

3.1 Zone of Influence

The current guidance on ecological impact assessments (Chartered Institute of Ecology and Environmental Management (CIEEM, 2018) recommends that all ecological features that occur within a 'Zone of Influence' (ZoI) for a proposed development are investigated.

The ZoI includes:

- Areas directly within the land take for the proposed development and access;
- Areas which will be temporarily affected during construction;
- Areas likely to be impacted by hydrological disruption; and
- Areas where there is a risk of pollution and noise disturbance during construction and/or operation.

The ZoI is variable depending on the nature of the construction activities and the ecological receptors affected. For this assessment the following zones have been defined:

Ecological Feature	Zone of Influence
Statutory designated sites	2.0km
European designated sites for bats	10.0km
Non-statutory designated sites	1.0km
Protected species records	1.0km
Protected species evidence	Within the buffer of the scheme

Source: Mott MacDonald Limited

For the purposes of this assessment, the scheme survey area has been defined as the combined areas of both the Colwyn Bay Waterfront Project – Phase 2b Area and the Old Colwyn Coastal Defence and Active Travel areas. The Phase 1 habitat map has been drawn to show both extents along with Phase 1abc Areas (the stretch between the two) for completeness.

3.2 Desk Study

A desk study was undertaken, as recommended in the CIEEM 'Guidelines for Preliminary Ecological Appraisal' – 2nd edition (2017), to determine the presence of any designated nature conservation sites and protected or notable species within the ZoI of the Scheme. Records within 1.0km of the site for both protected species and designated sites were requested from the local records information database Cofnod. The data has been further curtailed to the nearest records for each species recorded, raw data is available on request. Information to inform the desk study was obtained from the following sources:

- Cofnod (https://www.cofnod.org.uk/Home);
- Multi Agency Geographical Information for the Countryside (MAGIC) website (http://www.magic.gov.uk/MagicMap.aspx);
- Natural Resources Wales (NRW) (http://naturalresources.wales); and
- Joint Nature Conservation Committee (JNCC) (http://jncc.defra.gov.uk).

3.3 Field Survey

Field surveys were undertaken by experienced surveyors in December 2019 and January 2020.

All habitats within the survey area, where accessible, were identified and mapped in compliance with the 'Handbook for Phase 1 Habitat Survey: a technique for environmental audit' (JNCC, 2010). Dominant plant species were noted, as were any protected, uncommon or invasive species listed on Schedule 9 of the WCA (as amended). The methodologies and assessment criteria used were based on current published guidance.

The buildings within the survey areas were inspected for bat potential. Given restrictions to survey work (see limitations), detailed photographs of the buildings including close up photographs of features where bats may be able to gain access to voids in structures were taken by a local surveyor. These photographs were then analysed by an experienced and licensed bat ecologist to assess the potential of the buildings to support roosting bats and/or signs of bat presence in accordance the table below, based on the Bat Conservation Trust Good Practice Guidelines (Collins, ed. 2016).

Table 3.1: Bat Suitability Classification

Suitability	Description Roosting Habitats	Commuting and Foraging Habitat
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site to be used by commuting or foraging bats.
Low	A structure with one or more potential roost features (PRF) that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited rooting potential.	Habitat that could be used by small numbers of commuting bats such as a hedgerow with gaps or un-vegetated stream, but isolated, (i.e. not very well connected to the surrounding landscape by other habitat). Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broad-leaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.

Source: (Collins, ed. 2016).

For the intertidal zone, feedback received during the emergency works (Splashpoint) from the County Ecologist along with previous survey work indicated that the key concern is the presence of mussel beds. On this basis, for ease of interpretation, a separate biotope map has not been undertaken (as was completed for Splashpoint – updating the CCW biotope mapping) but instead the key intertidal habitat types have been included in the Phase 1 map along with the extent of mussel beds and location of *Sabellaria alveolata* Reefs as additional features.

3.4 Limitations

Biological records obtained from third parties and presented in the desk study do not represent a full and complete species list for the area. The records are mostly provided by individuals on an *ad-hoc* basis, often meaning there are areas of deficiency in the data. If species records are not present it may be as a result of the area being under surveyed and as such no records have been returned, lack of species should therefore not be disregarded.

Ecological surveys are limited to factors which affect the presence of plants and animals, such as time of year, migration patterns and behaviour. It is possible that certain species may have been overlooked or under-recorded during the assessment as optimal survey periods vary from species to species.

Due to the Government's restriction imposed to limit the spread of the Covid-19 virus, it was necessary to assess the bat roosting potential of structures within the survey area by using detailed high-resolution photographs, rather than by assessment in the field. This was done with the aim of minimising the time spent working in publicly accessible areas.

4 Results and Interpretation

4.1 Desk Study

A desk study was undertaken to identify key species and habitats near and adjacent to the site. The results are presented in the following sections.

4.1.1 Statutory Designated Sites

There are five statutory designated sites within 2.0km of the survey area. No Special Areas of Conservation (SACs) designated for bats were returned within 10.0km of the survey area. A map of these designated sites is provided in Appendix B. Details of the designated sites are provided in Table 4.1 below:

Table 4.1: Statutory Designations within 2.0km

Name	Status	Details	Distance and Direction
Bae Lerpwl / Liverpool Bay	Special Protection Area (SPA), Important Bird Area (IBA)	The inshore area of Colwyn Bay lies within the boundary of Bae Lerpwl / Liverpool Bay SPA. The SPA regularly supports more than 1% of the British populations of red-throated diver (*Gavia stellate*), 1% of the biogeographical population of common scoter (*Melanitta nigra*) and more than 50,000 waterfowl during the non-breeding season.	Adjacent to the north
Fairy Glen	Local Nature Reserve (LNR)	Ancient broadleaved woodland along the banks of the river Colwyn, supporting species such as grey wagtail (*Motacilla cinereal*).	Approximately 0.5km south east
Upper Dingle Woods	LNR	Broadleaved woodland supporting species such as lesser celandine (*Ficaria verna*) and bluebell (*Hyacinthoides non-scripta*).	Approximately 0.6km south east
Pwllycrochan Woods	LNR	Ancient broadleaved woodland supporting species such as great spotted woodpecker (*Dendrocopos major*), treecreeper (*Certhia familliaris*) and tawny owl (*Strix aluco*).	Approximately 0.8km south west
Bryn Euryn	Site of Special Scientific Interest (SSSI) and LNR	Species rich grassland upon carboniferous limestone, with notable species such as hoary rockrose (*Helianthemum canum*), bloody cranesbill (*Geranium sanguineum*) and Nottingham catchfly (*Silene* nutans) present.	Approximately 0.8km west
Creuddyn Peninsula Woods	SAC and SSSI	A collection of semi-natural broadleaved woodlands upon carboniferous limestone hills, which are an example of *Tilio-acerion* forest on the western boundary of their range. Pockets of yew (*Taxus baccata*) dominant woodland are also present with patches of species rich calcareous grasslands. Rare flora such as spiked speedwell (*Veronica spicata*) and spring cinquefoil (*Potentilla neumanniana*) are present.	Approximately 1.9km south west

Name	Status	Details	Distance and Direction
Mynydd Marian	SSSI	Of special interest for its range of limestone (calcicolous) grassland communities as well as its population of the dwarf race of silver studded blue butterflies (*Plebejus argus ssp. Caernensis*). Nationally scarce plant species spring cinquefoil (*Potentilla neumanniana) (P. tabernaemontani*) is also present within stands of calcicolous grassland.	Approximately 2.0km south east

Source: MAGiC Cofnod, 2020 & JNCC

4.1.2 Non-Statutory Designated Sites

There is one non-statutory designated sites within 2.0km of the survey area. Details of this designated site is given below in Table 4.2.

Table 4.2: Non-Statutory Designations within 2.0km

Name	Status	Details	Distance and Direction
Coed Rhos Fossil Woodland	Local Wildlife Site	Candidate fossilised woodland, no survey information is currently available.	Within the Colwyn Bay Phase 2b area.
Royal Fishing Weir	Local Wildlife Site	Candidate intertidal site, no survey information is currently available.	Approximately 0.3km to the north west
Upper Dingle Woods	LWS	See LNR above	Approximately 0.6km south east
Pwllycrochan Woods	LWS	See LNR above	Approximately 0.8km south west
Bryn Euryn	LWS	See LNR above	Approximately 0.9km south west
Coed Sempyr	Local Wildlife Site	Candidate site consisting of broadleaved woodland, no survey information is currently available.	Approximately 2.0km south west

Source: Cofnod, 2020

4.1.3 Protected Species Records

Records of protected or notable species from within 1.0km of the survey area are listed within the following sections. Records of species such as badger and bat roosts are sensitive and should be treated as confidential.

4.1.3.1 Birds

Records of 127 species of bird were returned within 1.0km of the survey area, including the following WCA Schedule 1 species:

- Red kite (*Milvus milvus)*;
- Brambling (*Fringilla montifringilla*);
- Snow bunting (*Plectrophenax nivalis*);
- Common crossbill (*Loxia curvirostra*);
- Black-throated Diver (*Gavia arctica*);
- Great Northern Diver (*Gavia immer*);

- Red-throated Diver (*Gavia 14lveolat*);
- Long-tailed duck (*Clangula hyemalis*);
- Fieldfare (*Turdus pilaris*);
- Slavonian Grebe (*Podiceps 14lveola*);
- Little Gull (*Hydrocoloeus minutus*);
- Mediterranean Gull (*Larus melanocephalus*);
- Marsh Harrier (*Circus aeruginosus*);
- Merlin (*Falco columbarius*);
- Osprey (*Pandion haliaetus*);
- Peregrine (*Falco peregrinus*);
- Leach's Petrel (*Oceanodroma leucorhoa*);
- Black Redstart (*Phoenicurus ochruros*);
- Redwing (*Turdus iliacus*);
- Purple Sandpiper (*Calidris maritima*);
- Scaup (*Aythya marila*);
- Velvet Scoter (*Melanitta fusca*);
- Common Scoter (*Melanitta nigra*);
- Whooper Swan (*Cygnus 14lveol*);
- Roseate Tern (*Sterna dougallii*);
- Little Tern (*Sternula albifrons*);
- Black Tern (*Chlidonias niger*); and
- Whimbrel (*Numenius phaeopus*).

4.1.3.2 Mammals

Records of mammals were returned within 1.0km of the survey area as follows:

Bats

The following bat species were returned within 1.0km of the survey area:

- Common pipistrelle (*Pipistrellus pipistrellus*);
- Noctule (*Nyctalus 14lveola*);
- Soprano pipistrelle (*Pipistrellus pygmaeus*);
- Long-eared bat (*Plecotus* sp.); and
- Lesser horseshoe (*Rhinolophus hipposideros*).

The closest records are that of common pipistrelle and soprano pipistrelle which were recorded 0.2km from the survey area.

Badger

Eight records of badger (*Meles meles*) were returned within 1.0km of the survey area, with the closest record approximately 0.3km to the south.

Hedgehog

A total of 25 records of hedgehog (*Erinaceus europaeus*) were recorded within 1.0km of the survey area, with the closest recorded 0.06km to the south.

Porpoise

A single record of a common porpoise (*Phocoena phocoena*) was returned within the survey area. The marine habitats off-site to the north are also occasionally used by other marine mammals including common bottlenose dolphin (*Tursiops truncatus*) and grey seal (*Halichoerus grypus*) .

4.1.3.3 Herpetofauna

A single record of slow worm (*Anguis fragilis*), common lizard (*Zootoca* vivipara) and grass snake (*Natrix natrix*) were returned within 1.0km of the survey area, with the closest record of a slow worm approximately 0.9km to the south.

A single record of the non-native species Aesculapian snake (*Zamenis longissimus*) was also returned within 1.0km of the survey area. This is considered to be a zoo escape from the local Mountain Zoo.

Seven records of common frog (*Rana temporaria*) were returned within 1.0km of the survey area, with the closest record approximately 0.5km to the south.

4.1.3.4 Invertebrates

A total of 25 invertebrate species were returned within 1.0km of the survey area, with the closest record of holly blue (*Celastrina argiolus*) approximately 0.5km to the south west.

Three records of the invasive species Harlequin ladybird (*Harmonia axyridis*) were also returned within 1.0km of the survey area, with the nearest record 0.3km to the south west.

4.1.3.5 Flora

Bluebell (*Hyacinthoides non-scripta*) which is listed on Schedule 8 of the WCA 1981 was recorded approximately 0.5km away from the survey area.

4.2 Site Visit

The survey area sits on the intertidal zone with the Irish sea to the north and comprises the intertidal zone (beach and associated habitats) along with the current cycle path and adjacent amenity or re-colonising habitats on the embankments of the road and railway line.

For ease of interpretation, rather than produce separate terrestrial and marine maps, both the terrestrial and marine / intertidal survey information has been mapped onto a Phase 1 Habitat Map with specific additions of key marine features and habitat types (such as mussel beds). References to the key habitat types and biotopes are included in the text below.

4.2.1 Habitats

The habitats recorded within the survey area are described in Table 4.3 below along with reference to which areas of the scheme they are relevant to. The Phase 1 Habitat Map is provided within Appendix A. Example photographs of habitats are provided in Appendix C.

Table 4.3: Description of Habitats present in the survey area

Terrestrial / Marine	Habitat Code	Habitat Type	Description	Colwyn Bay Waterfront Project – Phase 2b Area	Old Colwyn Coastal Defence and Active Travel
Terrestrial	A2.1	Dense / continuous scrub	Dense bramble (*Rubus fruticosus*) is present on the railway embankment in the east of the survey area and on the road embankments south of the promenade behind the Phase 1abc and Phase 2b areas. As well as bramble, this habitat supported occasional ivy (*Hedera helix*), sycamore saplings (*Acer pseudoplatanus*), willow saplings (*Salix* sp.), bindweed sp. (*Convolvulus* sp.), horsetail sp. (*Equisetum* sp.) and hemp agrimony (*Eupatorium cannabinum*).	✓	✓
Terrestrial	A2.2	Scattered scrub	Scattered scrub is present within the semi-improved grassland habitat along the railway embankment in the east of the survey area. Species present include broom (*Cytisus* sp.), gorse (*Ulex* sp.) and blackthorn (*Prunus spinosa*).	✓	✓
Terrestrial	A3.3	Scattered mixed trees	Young scattered trees are present along the railway embankment in the east of the survey area and scattered along the roadside to the north west, including Scott's pine (*Pinus Sylvestris*), beech (*Fagus sylvatica*), sycamore, elm sp. (*Ulmus* sp.), pedunculate oak (*Quercus robur*), white poplar (*Populus alba*) and ash (*Fraxinus excelsior*).	✓	✓
Terrestrial	B6	Poor semi-improved grassland	Poor semi-improved grassland, parts of which were outgrown and appeared unmanaged, is found along much of the extent of the railway embankment in the east of the survey area. Scattered scrub and trees are found within the grassland, with some patches of tall ruderal. The grassland was dominated by fescue (*Festuca* sp.), with Yorkshire fog (*Holcus lanatus*) and false oat (*Arrhenatherum elatius*) found to the edges and occasional broadleaved dock (*Rumex obtusifolius*), greater plantain (*Plantago major*).	✓	✓
Terrestrial	C3.1	Tall ruderal vegetation	Patches of dense tall ruderal are found scattered within the poor semi-improved grassland and amongst the dense scrub and scattered trees in the east of the survey area. As a result, this habitat is not mapped but listed here for completeness. Species recorded in the ruderal vegetation includes rosebay willowherb (*Epilobium angustifolium*), hogweed (*Heracleum sphondylium*), knapweed (*Centaurea nigra*), bindweed (*Convolvulus arvensis*), ragwort (*Jacobaea* sp.), and nettle (*Urtica dioica*).	✓	✓
Terrestrial	G2	Running water	A culverted water course runs under the A55 and outflows at the eastern point of the Promenade in the eastern extent of the scheme. Due to the small scale of this habitat it is not specifically mapped but described here for completeness.		✓
Terrestrial	J1.2	Amenity grassland	Amenity grassland is present throughout the survey area, alongside the existing cycleway and at the base of the railway embankment in the east. The amenity grassland comprised close-mown, regularly managed	✓	✓

Terrestrial / Marine	Habitat Code	Habitat Type	Description	Colwyn Bay Waterfront Project – Phase 2b Area	Old Colwyn Coastal Defence and Active Travel
			grassland. Species recorded include perennial ryegrass (*Lolium perenne*), annual meadow grass (*Poa annua*), common daisy (*Bellis perennis*), ribwort plantain (*Plantago 17lveolate17*), dandelion sp. (*Taraxacum* sp.), creeping buttercup (*Ranunculus repens*) and yarrow (*Achillea millefolium*).		
Terrestrial	J3.6	Buildings and infrastructure	A number of buildings and structures are present throughout the survey area in the form of: • Railway bridges (stone abutments and wing walls of beam construction with a steel span, which is in a good state of repair); • Bus shelters (open with pebble dash walls and a flat roof); • Information centre (pitched tiled roof with concrete walls, artificial lighting on the external walls and a glass walled conservatory); • Kiosks (Concrete walls and a flat roof with metal fascia boards); • Restaurant (concrete structure with wooden cladding on the external walls, with a flat roof and metal fascia boards, in a good state of repair); • Water sports centre (glass and metal walls with wooden cladding and a flat roof used as an observation point. Artificial lighting is present on the external walls. The building was in a good state of repair); and • Public toilets blocks (pitched tiled roofs of concrete construction in a good state of repair, with artificial lighting on the external walls and sealed windows and doors).	✓	✓
Terrestrial	J4 and J5	Fences and Walls	Fences and stone walls are present throughout the survey area, marking boundaries of the embankments and along the existing promenades. Given the small scale of these habitats they are not specifically mapped but are described here for completeness.	✓	✓
Terrestrial	J5	Hardstanding	Hardstanding is present in the form of the existing cycleway and promenade.		✓
Marine	H1.1	Intertidal sand	The intertidal area is largely dominated by sand, which forms the main habitat type across the survey area as well as in the Phase 1abc area between the two (where a beach recharge exercise has previously been undertaken).	✓	✓
Marine	H1.1	Intertidal mud	Areas of mud are present in the west of the survey area adjacent to the sea wall.	✓	
Marine	H1.2	Shingle and gravel	Areas of shingle / gravel are present throughout the intertidal survey area, largely along the southern edge of the beach adjacent to the coastal defences and surrounding areas of mud and brackish water. Species recorded associated with these habitats include Honeycomb worm (*Sabellaria 17lveolate*) along with acorn barnacles (*Semibalanus balanoides)*, periwinkle (*Littorina littorea*) and common limpet (*Patella vulgata)*.	✓	✓
Marine	H1.3	Boulders / rocks (groynes and other	A number of man-made groynes are present along the length of the survey area. These comprise large boulders and a number have navigation markers (metal posts) at the end.	✓	✓

Terrestrial / Marine	Habitat Code	Habitat Type	Description	Colwyn Bay Waterfront Project – Phase 2b Area	Old Colwyn Coastal Defence and Active Travel
		man-made features)	Many of the boulders had been colonised by green algae, macroalgae and lichens including yellow lichen (*Xanthoria parietina*), a grey lichen species (*Lecanora* sp.) and black tar lichen (*Verrucaria maura*). Other species recorded in association with the boulders and sea wall include acorn barnacles, sea lettuce (*Ulva lactuca*), spiral wrack (*Fucus spiralis*), common limpet, toothed wrack (*Fucus serratus*), beadlet anemone (*Actinia equina*), dogwhelk (*Nucella lapillus*), periwinkle, Darwin barnacles (*Elminius modestus*),Hydroids (*Plumularia catharina*) and Honeycomb worm.		
Marine	G1.6	Standing water – brackish	An area of standing, brackish water is present in the west of the survey area, surrounded by gravel substrate with some rocks and shingle within it.	✓	
Marine	J3.5	Sea wall	A concrete sea wall is present along the boundary of the beach (the front), forming part of the current coastal defences, atop which is the current promenade. Boulders and gravel are present adjacent to the wall. Parts of the wall have been colonised by green algae and macroalgae along with associated invertebrates (see species list in boulders).	✓	✓
Marine	-	Dense and sparse mussel beds	Two blue mussel (*Mytilus edulis*) beds were identified as part of the survey work undertaken, one located in the west of the survey area and one in the far east of the survey area. Both comprise areas of denser and sparse mussels (albeit both relatively sparse), interspersed with brown seaweeds, fucoids and barnacles, which have colonised in the middle of the sand. Both areas appear to be in poor condition and appeared to have previously been dense (marked as 'dense' on the mapping as a relative term) but sparse at the time of survey, whilst there were many cracked and empty shells present. From surveys completed for Phase 1abc EIA and Addenda in 2010 some areas of dense blue mussel aggregations were recorded at the end of groynes within the Phase 2b area (beyond the current survey area) which were noted to be larger in extent and may extend into the subtidal zone.	✓	✓
Marine	-	*Sabellaria alveolata* patches	Small patches of Honeycomb worm were noted within shingle and gravel areas in the east of the Scheme (see Appendix A for approximate location). These were recorded to be relatively isolated and small in extent and are considered to be in poor condition.		✓

4.2.2 Protected or Notable Species

A list of bird species observed during the surveys is reported separately in the Wintering Bird Survey Report (Mott MacDonald Limited, 2020).

No evidence of any other protected or notable species was recorded during the survey work undertaken. The potential for notable species is discussed in the relevant interpretation section. The results of the bat roosting assessment of buildings are set out separately in Table 4.2 below.

Table 4.2: Summary of Structures with Potential Roost Features

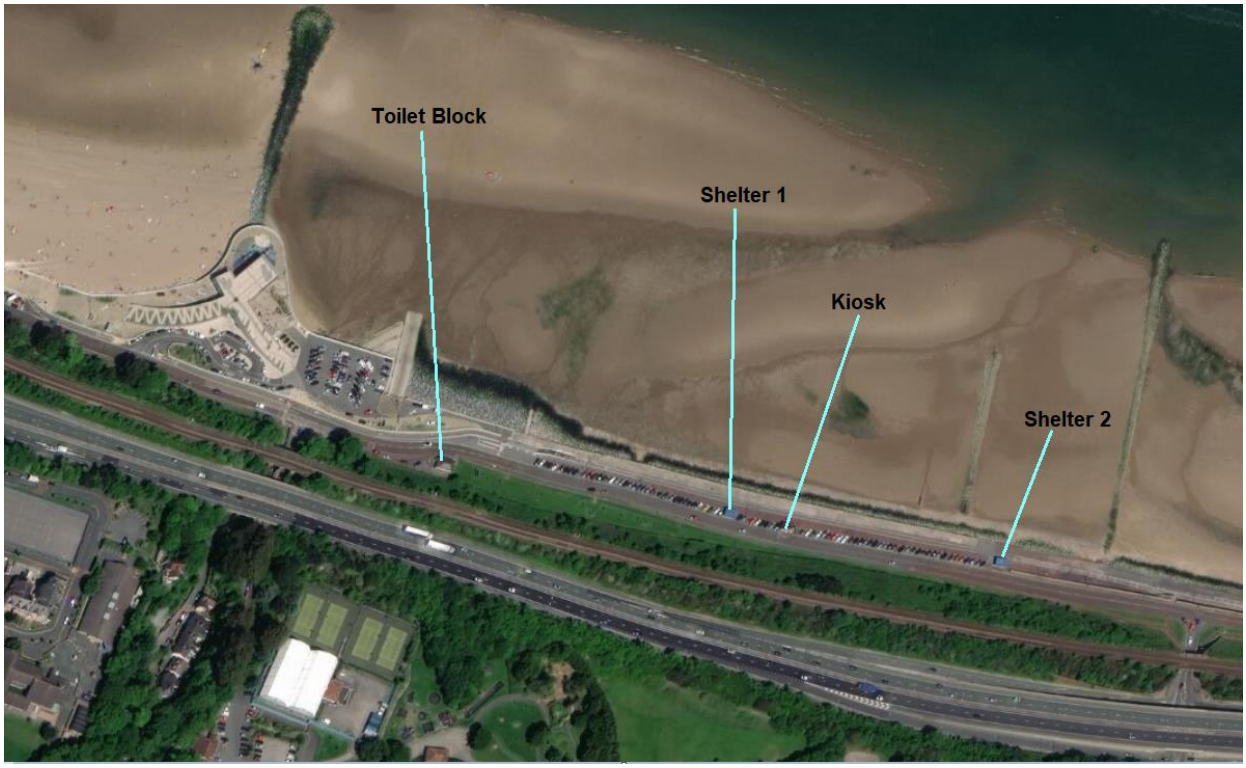
Building Reference and Photo	Building Description	Features
Kiosk 	• Concrete structure clad in coated wood and metal/ composite panels. • Flat roof, supported by metal beams.	• No potential roost features identified
Shelter 1 	• Concrete structure, clad in pebbledash. • Flat, hollow, wooden roof and fascia board with outer coating.	• Gap under coated wooden fascia board on south west corner. This feature gives access into a hollow cavity. 
Shelter 2	• Concrete structure, clad in painted pebbledash. • Flat, wooden roof and wooden fascia board with outer coating.	• No potential roost features identified

Building Reference and Photo	Building Description	Features
		
Toilet Block 	• Concrete walls with pitched, tiled roof with ridge tiles. • Exterior lighting present above doorways. • Composite material soffit box and fascia board present.	• Gaps visible under ridge tiles and other roof tiles.  

Source: Mott MacDonald

The location of the structures described in Table 4.2 above, is shown in Figure 4.1 below:

Figure 4.1: Location of structures assessed for potential roost features



Source: 'ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community'.

4.2.3 Invasive Plant Species

No evidence of any invasive plant species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) was recorded during the survey work undertaken.

4.3 Interpretation

4.3.1 Designations

Liverpool Bay SPA is located along the boundary of the survey area (approximately 45m from the boundary at its closest point). This is designated at an international level for the wetland bird species and assemblages present. Given the proximity of this designation, it has been scoped into the assessment of effects section below.

Coed Rhos Fossil Woodland LWS is located within the west of the survey area boundary. This is an archaeological / geological designation and therefore not addressed in this report.

All other statutory and non-statutory designations are considered sufficiently separated from the Scheme with no clear impact pathways. As such, these are considered unlikely to form a constraint to any proposals and are not considered further in this report.

4.3.2 Habitats

The following habitats within the survey area are considered to be of elevated value in the context of the site and could quality as Priority Habitats (as listed under Section 7 of the Environment (Wales) Act):

- **Subtidal Sands and Gravels:** The majority of the survey area is dominated by sand and gravel which would be submerged during high tide;
- ***Sabellaria alveolata* Reefs:** The small patches of honeycomb worm reef (*Sabellaria alveolata*) recorded within the east of the site could meet the description of the priority habitat *Sabellaria alveolata* Reefs. This priority habitat can typically be 30 to 50cm thick and form large expanses. The patches in the site were noted to be small and isolated in extent and appear to be in decline and poor health (possibly with some sections already dead) and as a result are not a high quality example of this priority habitat. This is likely due to the exposed nature of the site;
- **Blue mussel beds on sediment (within the survey area):** The mussel beds within the survey area broadly meet the description for this priority habitat, in that blue mussel beds are present within the sand substrate. However, the beds are isolated areas of relatively sparse mussels (with areas that appeared to have previously been dense) in poor condition are now all that are present. Blue mussel beds as a priority habitat is valued as having a role in coastal sediment dynamics, acting as a food source for overwintering waders and providing an enhanced area of biodiversity (typically associated with a range of organisms including fucoids, barnacles, ispods and other fauna). The mussel beds within the survey area are small and in poor condition (many fragmented and broken shells present on site), whilst no evidence of any diverse assemblage of associated organisms was recorded during the surveys undertaken. On this basis, the habitats on site are considered to be poor examples of this priority habitat type and are not considered to be of any elevated ecological value in a local context; and
- **Blue mussel beds on sediment (outside of the survey area):** Areas of dense and sparse blue mussel aggregations recorded at the end of groynes within the Phase 2b area (beyond the current survey area) during the Phase 1abc (2013) surveys could qualify as the priority habitat.

The boulders as part of the groynes and revetments are man-made, embedded in sediment and subject to tidal scour, such that they are not considered to have sufficient gaps on the underside to support a valuable under boulder community. They are therefore not considered to represent the priority habitat ‘Intertidal Underboulder Communities’.

The remaining intertidal and terrestrial habitats are largely small in extent and comprise either common and widespread species or are man-made structures, of no more than negligible-low ecological value at a site level.

4.3.3 Protected Species

On the basis of the habitats present, the site and surrounds could offer opportunities for a number of wetland bird species and marine invertebrates (although no notable species were recorded during the survey work). The marine habitats present on site could also support fish species, as a desktop search[1] shows that the wider marine area surrounding Colwyn Bay and areas further offshore to the north of the Site are considered to be a high intensity spawning ground for plaice (*Pleuronectes platessa*), cod (*Gadus morhua*), sand eel (*Ammodytes*

[1] Marine Plan Online Search Tool, 2020. Available at: https://explore-marine-plans.marineservices.org.uk/

tobianus) and sole (*Solea solea*), as well as a high intensity nursery ground for cod (*G. morhua*), sole (*S.solea*) and whiting (*Merlangius merlangus*).

A summary of the potential of structures within the survey area, to provide opportunities for roosting bats, is set out below in Table 4.3.

Table 4.3: Assessment of the Bat Roosting Potential of Structures

Building	Feature(s)	Assessment of Bat Roost Potential
Kiosk	No potential roost features identified	**Negligible** potential
Shelter 1	Gap under coated wooden fascia board on south west corner.	**Low** potential The shelter is located on the exposed coastal promenade with limited connectivity to wider habitat.
Shelter 2	No potential roost features identified	**Negligible** potential
Toilet Block	Gaps visible under ridge tiles and other roof tiles.	**Low** Potential Some access to foraging and commuting habitat. However, the block's overall opportunity to provide shelter is limited, being sited on the exposed coastal promenade and outward facing external lighting.

Source: Mott MacDonald

No features that would offer potential for roosting bats were noted in any of the bridges within the survey area, whilst a full survey of trees was not undertaken (this has been recommended in section 5). The existing promenade is lit and unlikely to be of value to more light sensitive species such as lesser horseshoe or myotis bats (for which records were returned) but could be used by more light tolerant species such as pipistrelle bats for foraging.

The semi-improved grassland, tall ruderal and scrub habitats (particularly the railway embankment) offer suitable opportunities for reptiles, records of which were returned from within 1.0km of the survey area. The trees, scrub and buildings could support nesting birds. The railway embankments could also offer opportunities for badger, which are known to be present in the local area from records returned, albeit as these are exposed and so are, at best, sub-optimal. Habitats in the site could also offer potential for a number of common mammal species.

No records of otter were identified within the search area whilst the habitats offer limited suitability for this species.

5 Assessment and Recommendations

5.1 Identification of Ecological Constraints

On the basis of the habitats and present and survey work completed, as identified in the interpretation section, the following potential ecological constraints have been identified:

- Liverpool Bay SPA;
- Subtidal sands and gravels (priority habitat);
- Blue mussel beds on sediment (priority habitat) – within and outside of the survey area;
- Roosting and foraging bats;
- Wintering and foraging birds;
- Nesting birds;
- Reptiles;
- Fish; and
- Marine invertebrates.

On the basis of the proposed scope of works, a high-level assessment of effects is set out below.

5.2 Initial Assessment of Effects (High-level only)

It is anticipated that an assessment of effects would be undertaken once the detailed proposals are finalised, as part of an Environmental Impact Assessment (EIA) or Ecological Impact Assessment (EcIA) (subject to the results of the screening exercise). Depending on the exact design of works, effects on these receptors could be positive or negative. However, based on the broad scope of works available, an initial assessment of potential effects is provided within Table 5.1 below.

Table 5.1: Potential Ecological Constraints and Initial Assessment of Effects

Constraint	Location		Level of Protection	Initial Assessment
	Colwyn Bay Waterfront Project – Phase 2b Area	Colwyn Bay Coastal Defence and Active Travel		
Liverpool Bay SPA	45m from survey area	45m from survey area	EC Habitats Directive, SSSIs are protected under Wildlife and Countryside Act 1981 (as amended).	No direct effects on this SPA are anticipated but given the proximity, construction and maintenance works could result in disturbance or degradation of habitat (from increased turbidity during beach recharge works) for birds using the SPA. A HRA is required along with a marine licence. An initial assessment of effects on designated interest features of the SPA is set out within the Over-wintering bird report.
Subtidal sands and gravels	Throughout the site	Throughout the site	Environment (Wales) Act 2016	The works will include recharge of the beach and an increased cover of this habitat. The quality may change depending on from where the sand is sourced.

Constraint	Location		Level of Protection	Initial Assessment
	Colwyn Bay Waterfront Project – Phase 2b Area	Colwyn Bay Coastal Defence and Active Travel		
Sabellaria alveolata Reefs	-	Associated with shingle and gravels (see Appendix A)	Environment (Wales) Act 2016	No direct loss of *Sabellaria alveolata* Reefs is anticipated. In the absence of mitigation, this habitat may be affected by increased sediment and turbidity, whilst the reefs could be damaged during construction in the absence of safeguards.
Blue mussel beds	Western boundary of the Scheme	Eastern edge of the Scheme	Environment (Wales) Act 2016	The works will result in the partial or complete loss of the western mussel bed located within the existing sandy habitats, which would be covered during the beach recharge works. No direct loss of mussel beds outside of the Scheme footprint is anticipated. In the absence of mitigation, mussels may be affected by increased sediment and turbidity, whilst the eastern mussel bed could be damaged during construction in the absence of safeguards. Rocky habitat will be lost but also created under the Scheme proposals and so habitat will continue to be available under the Proposed Scheme for colonisation by mussels in the future.
Roosting bats	Trees, Bridges Buildings	Trees, Bridges Buildings	Bat species and their roosts are fully protected under the Conservation of Habitats and Species Regulations 2017 and the WCA. Various bat species are also listed under Section 7 Species of Principal Importance under the Environment (Wales) Act 2016.	No bat potential features were noted in any bridges or trees during the survey, but a full assessment was not undertaken. No impacts to trees or bridges are anticipated under the current works. If this scope changes consideration would need to be given to assessing these structures for bats. Shelter 1 is to be demolished and re-built. Further survey required to ascertain presence/likely absence of bats. If present, a licence would be required. The Toilet Block is to be refurbished, the scope of which has not yet been confirmed. Should this work have potential to disturb bats, further surveys would be needed.
Foraging bats	Tree lines and under streetlights	Railway embankment, tree lines and under streetlights		Vegetated habitats and streetlights within the survey area may be used by foraging bats, which are known to be present in the area. Any change to these habitats, including a new lighting design, could affect availability of foraging resource. Depending on the scheme design, this could result in a betterment for bats.
Badger	-	Railway embankments	Badgers are protected under the Protection of Badgers Act 1992	No evidence of badgers was noted during the survey and the likelihood of this species being present is considered extremely low but given local records cannot be ruled out. The current scope of works does not affect the railway embankment. Should the scope change, consideration would need to be given to this species which could move into the survey area prior to works.

Constraint	Location		Level of Protection	Initial Assessment
	Colwyn Bay Waterfront Project – Phase 2b Area	Colwyn Bay Coastal Defence and Active Travel		
Over-wintering and foraging birds	Intertidal zone and off-shore	Intertidal zone and off-shore	(see SPA)	(see SPA above)
Nesting birds	Scrub, trees and buildings / structures	Scrub, trees and buildings / structures	All breeding birds are protected under the WCA 1981 (as amended) with Schedule 1 birds afforded greater protection from disturbance	Habitats within the Scheme have the potential to support nesting birds. Any works affecting these habitats could result in loss of nesting habitat and direct effects on nesting birds.
Reptiles	-	Railway embankments and verges	Reptiles are afforded varying degrees of protection under WCA. All reptiles are listed under Section 7 Species of Principal Importance under the Environment (Wales) Act 2016	The railway embankment habitats and scrub areas may provide suitable habitat for reptiles. Any works to these vegetated areas could adversely affect this species group (if present) and reduce available habitat.
Fish	In-shore	In-shore	Certain fish species are fully protected under the Conservation of Habitats and Species Regulations 2017 and the WCA.	The beach recharge works could result locally in small increases in sedimentation and turbidity which could affect small fish and invertebrates (prey). However, this would be temporary, probably in keeping with the tidal regime, and on a wider scale the bay is a large area which is available for fish and their prey. It is also anticipated that this would be undertaken at low tide above the water level, further minimising impacts.
Invertebrates and other submerged or benthic communities	In-shore	In-shore	Various species are protected under legislation and listed in planning policy	The beach recharge works could result locally in small increases in sedimentation and turbidity which could affect invertebrates, submerged seaweeds / plants and filter feeding organisms. However, this would be temporary and would not affect the entire bay (as Phases 1abc have already been completed). It is also anticipated that this would be undertaken at low tide above the water level, further minimising impacts. Settlement of larval mussels, fucoids and algal turf is anticipated to occur soon after the works have completed.

Source: Mott MacDonald Limited

In respect of over-wintering birds, an assessment of effects informed by the survey results is reported separately (Mott MacDonald Limited, 2020).

5.3 Recommendations

On the basis of the assessment of effects above, recommendations are made below for further survey and assessment along with mitigation and enhancement measures that are likely to be appropriate for the Scheme:

5.3.1 Further Survey and Assessment

Given the proximity of the Liverpool Bay SPA, it is recommended that the following is undertaken:

- A Habitats Regulations Assessment (HRA) Screening Report should be undertaken to ascertain any likely significant effects from both the Colwyn Bay Waterfront Project – Phase 2b works and the Colwyn Bay Coastal Defence and Active Travel works on the designation;
- Wintering bird surveys should be undertaken to ascertain the use of the local area by wintering birds and inform the HRA. This survey work was completed in December 2019 and January 2020 and the results are reported separately (Mott MacDonald Limited, 2020); and
- Bat emergence/return surveys are required for the structures identified with low bat roosting potential. Shelter 1 is proposed to be demolished and the toilet block is proposed for refurbishment (the scope of which has not been defined). They each require a single emergence/ return survey. These surveys will need to be undertaken between May and August.

If the scope of works changes to directly affect any trees or bridges, further survey would be required to assess bat roosting potential and, if required, ascertain the presence / likely absence of bats.

If the scope of works changes to affect the embankments, a walkover survey to check for evidence of badgers is recommended at least 8 weeks prior to commencement of works.

5.3.2 Mitigation and Licensing

As with the assessment of effects, it is anticipated that mitigation and enhancement measures would be included as part of an EIA or EcIA document, or within a bespoke mitigation report, to be completed once the design, construction methodology and programme for each Scheme is finalised. However, on the basis of the high-level assessment of effects and current proposals for each Scheme, it is anticipated that any mitigation strategy would include the below measures.

Where mitigation measures are relevant to only one of the Schemes, this is stated below. Otherwise the below are considered relevant to both.

- **Liverpool Bay SPA – Marine Licence.** A marine licence will be required from NRW for any works that could affect the SPA, including beach recharge and costal defence upgrade works;
- **Habitats – Subtidal Sand and Gravels.** It is recommended that the sand for the beach recharge is sourced from the near vicinity of the site;
- **Habitats – *Sabellaria alveolata* Reefs.** Works should be confined to the footprint of works so as to ensure no adverse effects to *Sabellaria alveolata* Reefs outside of the survey area are affected. Safeguards such as fencing should be used to ensure this. Consideration should be given to the design of new rocky substrate habitats to maximise availability for colonisation by *Sabellaria alveolata*;
- **Habitats – Mussel Beds.** Works should be confined to the footprint of works so as to ensure no adverse effects to mussel beds outside of the survey area are affected (such as those known to be present to the north of Rhos Harbour). It is recommended that works to the beach be undertaken at low tide, where possible, to reduce the impacts of sedimentation on the marine habitats in the vicinity. The percentage of fine particles in the recharged beach material should be minimised to reduce smothering risk within subtidal aggregations by working at low tide for any methods that would be considered to increase sedimentation in

the water column. Consideration should be given to the design of new rocky substrate habitats to maximise availability for colonisation by mussel spat and inclusion of artificial rockpools at varying levels and locations along the scheme;

- **Roosting Bats.** If further surveys find evidence of roosting bats, then appropriate safeguards (including supervised soft-demolition of the buildings or strip of features) under licence by NRW would be required;
- **Foraging Bats.** Consideration should be given to bats in any new lighting design and landscape planting to ensure this is sensitive to the species known to be present in the area (in line with best practice guidance from the Bat Conservation Trust and the institute for Lighting Processionals, 2018) and, where relevant, continues to offer the same if not enhanced opportunities for foraging bats. It is recommended that an ecologist is consulted on the lighting and planting schemes for the development;
- **Over-Wintering Birds.** Recommendations in respect of over-wintering birds are set out within a separate report (Mott MacDonald Limited, 2020);
- **Nesting Birds.** Vegetation, including scrub and trees, should be retained where possible. Where vegetation loss or management is required, this should eb undertaken outside of the nesting bird season (typically March – August inclusive) or following the negative result of a nesting bird check by a suitably qualified ecologist;
- **Reptiles.** Vegetation, including scrub and long-sward grassland (particularly along the railway embankment) should be retained, where possible. Where vegetation loss or management is required, this would need to be supervised by a suitably qualified ecologist and preceded by a toolbox talk to contractors and a hand search for reptiles; and
- **General Construction Safeguards (including badgers and other mammals)**. A CEMP should be produced prior to site works commencing to determine the reasonable and practicable steps to be taken to avoid pollution of the surrounding environment and safeguard wildlife. This should include measures to safeguard species such as badger (if present), hedgehog and other mammals which may be present. Such measures are anticipated to include staged strimming of long-sward grassland, ruderal vegetation and scrub; identification and avoidance of mammal burrows; and placement of arisings.

5.3.3 Enhancement

At national level, Chapter 6 of Planning Policy Wales requires Local Authorities to take measures to promote the conservation of landscape and biodiversity. It is therefore recommended that, to comply with the above planning policy, the opportunity is taken to incorporate ecological enhancements into the development.

In addition, during 2019 the Government produced the Environment Bill Policy Statement which, when the legislation comes into effect, will legally require developers to ensure habitats for wildlife are enhanced, with a 10% increase in habitat for wildlife compared with the pre-development baseline. This means the Councils across England will have a duty to ensure that any plans or projects provide biodiversity net gains, as opposed to ‘no net loss’. Although the legislation to support this does not currently apply to Wales, it is expected to become a legal requirement from Welsh Government and clients are advised to plan accordingly.

At a local level, policy NTE/3 of the Local Plan promotes incorporating ecological enhancements into new development.

It is understood that an area of Colwyn Bay Coastal Defence and Active Travel has been identified for ecological enhancement as part of a ‘Back to Nature’ area. Such an enhancement would fall well in line with the above national policy objectives as well as local policy (NTE/3).

Enhancements that would be appropriate for both Schemes include the following:

- **Rocky Shore Habitat Creation** - Creation and management of new rocky shore habitat and artificial rockpools*, with options including bioblocks, drill coring, vertipools and enhanced sea walls;
- **Wildflower Grassland** – Wildflower grassland could be created on verges and embankments, planted with appropriate species**;
- **Landscaping Planting** – New or existing landscape planting could be planted to incorporate native species or species of wildlife value (i.e. fruit bearing shrubs and trees);
- **Habitat management** – retained and newly created habitats could be subject to an ecologically sympathetic management regime; including rotational or low-intensity cutting to encourage fruits and flowers; re-use of arisings for habitat piles; and avoiding use of herbicides;
- **Bat and bird boxes** - bat boxes could be integrated into, or installed on, any buildings and trees to provide enhanced roosting and nesting opportunities within the site in appropriate locations; and
- **Insect boxes** - insect boxes could be installed in retained or enhanced landscaping areas to provide enhanced nesting opportunities for invertebrates.

* careful placement to consider water depth and risk of sediment smothering would be required

** this may require initial management to reduce the nutrient load in the soil

6 Conclusions

A Preliminary Ecological Appraisal was undertaken to assess the potential constraints posed by ecological designations, protected and notable habitats and protected and notable species relating to the proposed Schemes in Colwyn Bay (Colwyn Bay Waterfront Project – Phase 2b and Colwyn Bay Coastal Defence and Active Travel).

The key constraint is the proximity of the Liverpool Bay SPA which lies 45m north of the Scheme. The survey area supports the priority habitats subtidal sand and gravels, *Sabellaria alveolate* reefs (small patches only) and blue mussel beds on sediment (two small mussel beds are present in the survey area, both of which comprise dense and sparse areas). All other habitats are considered to be of low ecological value and do not pose a constraint to any Scheme proposals. In terms of protected and notable species, the survey area has the potential to support bats, badger, other mammals, birds (nesting, foraging and overwintering), reptiles, fish and marine invertebrates. Further surveys are recommended for two buildings identified as having low bat potential.

Further surveys are also recommended in respect of wintering birds (these were undertaken in December 2019 and January 2020 and are reported separately), whilst a Habitats Regulations Assessment (HRA) screening and marine licence is recommended to assess effects on the SPA. Recommendations are made in respect of other habitats and species in terms of mitigation and opportunities for enhancement, although it is anticipated that these would be reviewed and refined once the proposals are finalised.

7 References

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Natural Resources Wales (2018). (Online: https://naturalresources.wales/conservationbiodiversity-and-wildlife/find-protected-areas-of-land-and-seas/designated-sitessearch/?lang=en); and

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Appendices

A. Phase 1 Habitat Map

Location Map

Key to Symbols

- Target note
- Phase boundaries
- Trees with low bat potential
- Honeycomb Worm Reef - sparse (approximate location)
- A3.1 - Broadleaved parkland/scattered trees
- A2.1 - Scrub - dense/continuous
- A3.1 - Broadleaved parkland/scattered trees
- B6 - Poor semi-improved grassland
- C1.1 - Bracken - continuous
- G1.6 - Standing water - brackish
- H1.1 - Intertidal - mud (approximate location)
- H1.1 - Intertidal - sand
- H1.2 - Intertidal - shingles/cobbles (approximate location)
- H1.3 - Intertidal - boulders/rocks (Groynes and man-made features)
- J1.2 - Cultivated/disturbed land - amenity grassland
- J3.5 - Artificial sea wall
- J3.6 - Buildings & infrastructure
- J5 - Hardstanding
- Mussel bed - dense (approximate location)
- Mussel bed - sparse (approximate location)

Notes

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4. Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
5. Phase 1c beach recharge extended into the Phase 2b area while transitioning back to existing beach levels and Phase 2a promenade improvements straddled the Phase1 and Phase2 boundary.

Rev	Date	Drawn	Description	Ch'k'd	App'd
P5	23/07/20	SA	For information	NJS	JB

Mott MacDonald
2 Callaghan Square
Cardiff
CF10 5BT
T +44 (0)2920 467800
W www.mottmac.com

Client: Conwy County Borough Council

Title: Colwyn Bay Phase 1 Habitat Survey

Designed	L Woolley	LW	Eng. Check	N J Spofforth	NJS
Drawn	S Anstice	SA	Coordination	L Woolley	LW
GIS Check	H Wheldon	HW	Approved	J Bates	JB

Scale at A3	Status	Rev	Security
1:10,000	INF	P5	STD

Drawing Number: 410895-MMD-00-XX-DR-C-0004

0 100 200 300 400 500 Meters

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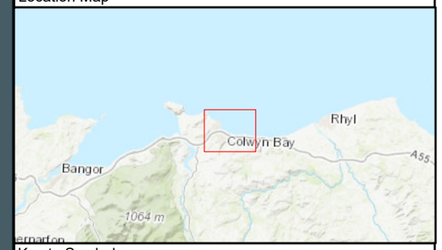
B. Designated Site Plan

Location Map



Key to Symbols

- 2 km buffer
- RSPB Reserves
- Local Nature Reserve (LNR)
- Local Wildlife Sites (LWS)
- Important Bird Area (IBA)
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- Site of Special Scientific Interest (SSSI)
- Ancient Woodland

Notes

1. Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
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Rev	Date	Drawn	Description	Ch'k'd	App'd
P2	23/07/20	SA	For information	LW	JB
P1	10/02/20	HW	For information	LW	JB

MOTT MACDONALD

Mott MacDonald House
5 Woodland Road West
Colwyn Bay
LL29 7DH
United Kingdom
+44 (0)1492 534601
W www.mottmac.com

Client

Conwy County Borough Council

Title

Colwyn Bay
Designated sites plan

Designed	L Woolley	LW	Eng Check	L Woolley	LW
Drawn	H Wheldon	HW	Coordination	L Woolley	LW
GIS Check	G O'Donovan	GO	Approved	J Bates	JB

Scale at A3	Status	Rev	Security
1:25,000	PRE	P1	STD

Drawing Number
410895-MMD-00-XX-DR-C-0005

0 0.2 0.4 0.6 0.8 1 Kilometers

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C. Habitat Photographs

Figure C.1: Mussel Beds

Source: Mott MacDonald Limited

Figure C.2: Buildings and Infrastructure

Source: Mott MacDonald Limited

Figure C.3: Hardstanding

Source: Mott MacDonald Limited

Figure C.4: Running Water (culverted)

Source: Mott MacDonald Limited

Figure C.5: Poor Semi-improved Grassland

Figure C.6: Dense Scrub

Source: Mott MacDonald Limited

Source: Mott MacDonald Limited

Figure C.7: Intertidal Sand

Source: Mott MacDonald Limited

Figure C.8: Boulders

Source: Mott MacDonald Limited

Figure C.9: Sea Wall

Source: Mott MacDonald Limited

Figure C.10: Stone Wall

Source: Mott MacDonald Limited

Figure C.11: Amenity Grassland

Source: Mott MacDonald Limited

Figure C.12: Scattered Trees

Source: Mott MacDonald Limited

Figure C.13: Intertidal Mud Habitat

Source: Mott MacDonald Limited

Figure C.14: Algal Turf, Fucoids, Intertidal mud and sand habitats

Source: Mott MacDonald Limited

Figure C.15: *Sabellaria alveolate* reefs

Figure C.16: Brackish Water

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Appendix 9.4 – Intertidal Biotope Survey Report

MOTT MACDONALD

Colwyn Bay Waterfront Project Phase 2b

Intertidal Survey Report

August 2021

Mott MacDonald
Mott MacDonald House
5 Woodland Road West
Colwyn Bay LL29 7DH
United Kingdom

T +44 (0)1492 534601
mottmac.com

Environment Roads & Facilities
Conwy County Borough Council
Mochdre Council Offices

Colwyn Bay Waterfront Project Phase 2b

Intertidal Survey Report

August 2021

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
P01	21 August 2021	A. Jones B. Morley	D. Jones N. Spofforth	N. Haines	First Issue

Document reference: 100374-MMD-00-XX-RP-N-0007

Information class: Standard

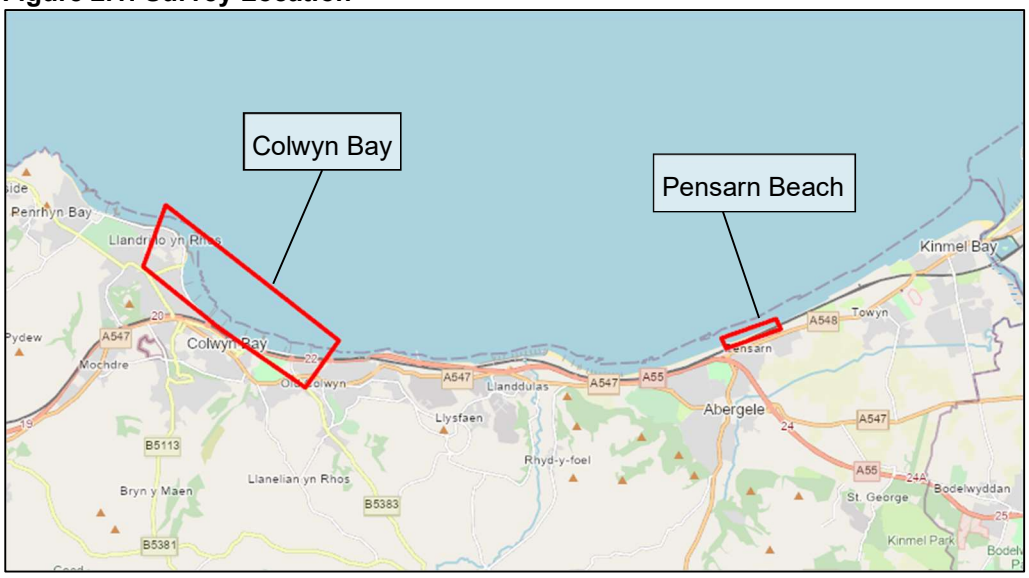
Contents

Introduction

1.1 Scheme Background

Mott MacDonald Ltd have been appointed by Conwy County Borough Council (CCBC) to undertake an intertidal walkover survey of Colwyn Bay as part of the Colwyn Bay Waterfront Project Phase 2b Scheme (hereafter referred to as the 'Scheme') to improve the coastal defences and promenade along the Colwyn Bay frontage in North Wales (Figure 2.1). A walkover of Pensarn beach was also undertaken as it is the proposed location for pipeline construction relating to the beach recharge forming part of the Scheme.

Figure 2.1: Survey Location



Source: Map data © OpenStreetMap contributors, Map layer by Esri

The Colwyn Bay coastline between Rhôs Point and Tan Penmaen Head is approximately 3.5km in length. Coastal flood defences were constructed for much of the coastline in the late 19th century and in general comprised vertical seawalls in either masonry or concrete[1].

Timber groynes were constructed in the 1970s in response to beach lowering to retain the sand, these ultimately failed or became redundant due to a lack of ongoing maintenance. As a result, by the 1980's, the frontage experienced a gradual lowering of beach levels at the wall toe, resulting in foundation problems which has required ongoing maintenance and repairs to ensure their integrity and stability[2].

Since the 1990s, routine maintenance of the existing coastal defences has been carried out to extend their residual life. This has included patch repair of the concrete and masonry walls as well as the addition of protective rock toes and revetment facings in some areas. Emergency works comprising the addition of further piled and rock toes were also carried out in several locations along the seawalls following severe storms.

[1] Mott MacDonald Ltd, March 2021. Colwyn Bay Waterfront Phase 2b Environmental Impact Assessment (EIA) Scoping Report. Reference number: 100374-MMD-00-XX-RP-E-0001

[2] Joint Defra/EA Flood and Coastal Erosion

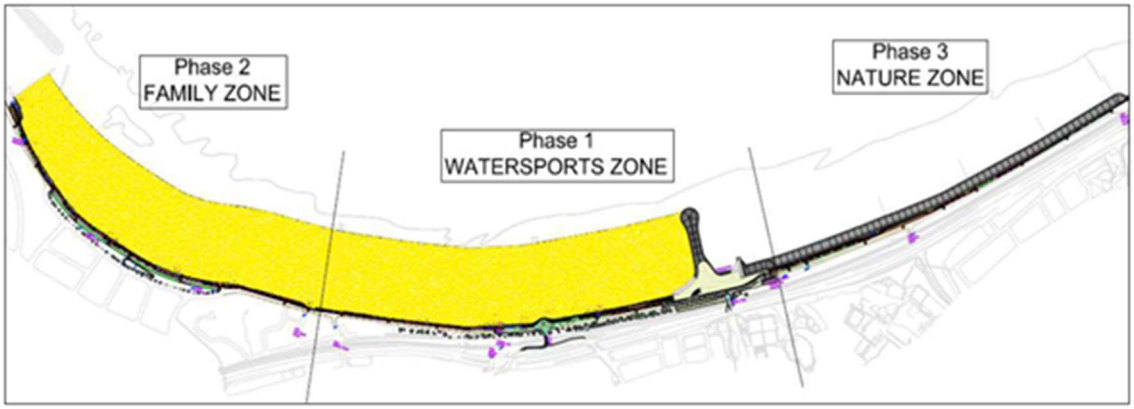
Risk Management R&D Programme - Beach lowering in front of coastal structures, June 2003 [Online] Available at: 8090 R&D Coast and Flood cov 1s (publishing.service.gov.uk) [Accessed May 2021]

The Colwyn Bay Waterfront Project is divided into three main phases (Figure 2.2) as follows:

- Phase 1 area from Porth Eirias to the Cayley embankment (already complete);
- Phase 2 area from the Cayley embankment to Rhôs-on-Sea Harbour (current phase); and
- Phase 3 area, from Splashpoint to Porth Eirias (separate scheme).

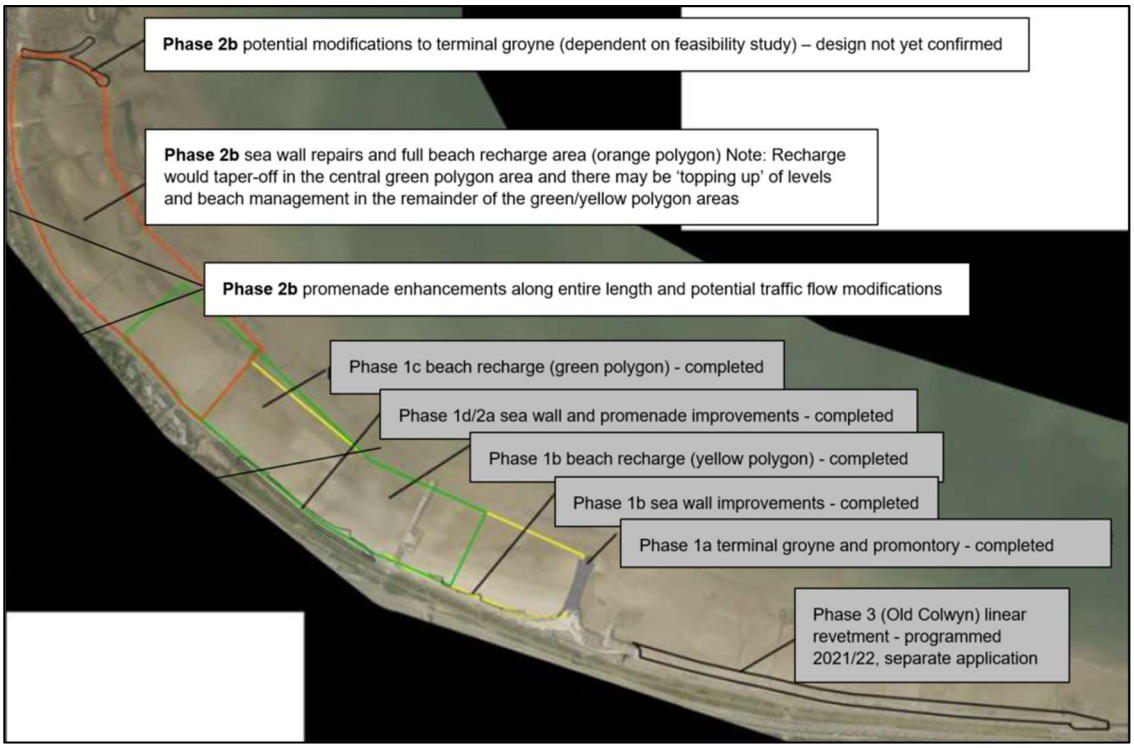
The phases have been divided further into a number of sub-phases (Figure 2.3). A full summary of works is provided in the Colwyn Bay Waterfront Phase 2b EIA Scoping Report[1].

Figure 2.2: Colwyn Bay Waterfront – overall project phasing



Source: Project Appraisal Review and Update Report, CCBC, 2018

Figure 2.3: Colwyn Bay Waterfront - coastal works sub-phasing



Source: Adapted from Project Appraisal Review and Update Report, CCBC, 2018

The coastal defence works for the Scheme are understood at the current time to include[1]:

- From Rydal Boat store to the southern boundary of Rhôs-on-Sea Harbour:
  - Minor repairs (e.g. re-pointing) to the existing sea wall;
  - Removal of remaining areas of existing rock revetment located against the sea wall in recharge areas for re-use in modifying the Rhôs-on-Sea Harbour terminal groyne; and
  - Modification of outfalls as appropriate to enable them to continue operating with the raised beach levels.
- From Horizon Shine to the southern boundary of Rhôs-on-Sea Harbour:
  - Beach recharge involving the importation and placement of approximately 1,000,000t (~666,000m^3) of dredged sand material between the Rhôs-on-Sea terminal groyne to the west and the Horizon Shine Kiosk to the east to bring levels up to match the design profile of the Phase 1 works (approximately 5mAOD); and
  - Beach recharge is to be undertaken via barge with proposed floating and sinker pipeline construction to be undertaken at Pensarn Beach.
- To the east of the Horizon Shine Kiosk:
  - The Scheme will also appropriately include for any ‘topping up’ of beach levels and the management/recycling of the existing beach that may be required between the Horizon Shine Kiosk and the location of the new Colwyn Bay Pier.

This report covers the following areas:

- The Phase 2b area, which extends from the Rydal Boat store to Rhôs-on-Sea Harbour;
- A confirmatory walkover of the Phase 1 and 3 areas (Phase 1 extending from Porth Eirias to the Rydal Boat store and Phase 3 covering Porth Eirias to Splashpoint);
- Pensarn beach, the proposed location for the pipeline construction associated with the beach recharge; and
- The area west of Rhôs-on-Sea Harbour, an area identified with the potential ecological enhancement (note: this area has since been discounted as being unsuitable for ecological enhancement).

1.2 Survey Aim

The aim of the survey was to provide an informative assessment of the range of coastal biotopes in the area and identify Features of Conservation Importance (FOCI) present in the Phase 2b Scheme area, proposed pipeline construction area at Pensarn Beach, and the area west of Rhôs-on-Sea Harbour. Additionally, confirmatory walkovers of the Phase 1 and Old Colwyn (Phase 3) areas were undertaken to confirm the findings of previous intertidal walkover surveys.

The Rhôs-on-Sea Shellfish Water is located within and immediately north of the Red Line Boundary, this area was included in the walkover survey.

2 Methodology

2.1 Survey

An intertidal walkover survey was undertaken on the 25 and 26 March 2021 by suitably qualified marine ecologists from Mott MacDonald, using best practice guidance Joint Nature Conservation Committee (JNCC) Marine Monitoring Handbook[3] and the JNCC Handbook for Phase 1 Habitat Survey, a Technique for Environmental Audit[4]. Marine habitat codes adopted from the Marine Habitat Classification for Britain and Ireland[5] are used to describe the biotopes observed during the survey. The survey commenced two hours either side of low tide to survey the extent of the intertidal zone (see Table 2.1 for tide times).

Table 2.1: Llandudno Tide Times and Heights

Date	Low Water	Height Above Chart Datum (m)
Thursday 25th March 2021	14:55	1.53m
Friday 26th March 2021	15:41	0.95m

Source: Mott MacDonald Ltd, 2021

2.2 Limitations

Due to adverse weather conditions on the original survey date, the survey was not conducted on the largest astronomical tidal range, therefore a proportion of the lower littoral zone was not exposed during the survey. Additionally, access to the area within and seawards of the harbour was limited (health and safety concerns regarding mudflats) therefore some flora and fauna species may be underrepresented although the broad habitat type was identified. Additionally, due to access restrictions to the Phase 1 intertidal area (relating to pier construction works), observations were conducted from the promenade.

Given the large study area (approximately 47ha), the survey was conducted as a walkover and transects were not recorded, however, the broad biotopes and species present for the upper, mid and lower littoral zone are considered to have been identified throughout the survey area.

As the survey was carried out in spring, any seasonal variation will not have been documented and the results should be viewed as a single snapshot in time which may not represent the change in species/habitats due to seasonal variations.

[3] Davies et al., 2001. Marine Monitoring Handbook [Online] Available at: Marine Monitoring Handbook: Procedural Guidelines (PG 4-5. Using photographic identification techniques) (jncc.gov.uk) [Accessed April 2021]

[4] JNCC, 2010. Handbook for Phase 1 habitat survey – a technique for environmental audit [Online] Available at: Handbook for Phase 1 habitat survey (jncc.gov.uk) [Accessed April 2021]

[5] JNCC, 2010. Marine Habitat Classification for Britain and Ireland. [Online] Available at: https://mhc.jncc.gov.uk/ [Accessed April 2021]

3 Results

The walkover was split across five broad areas:

- Potential enhancement area west of Rhôs-on-Sea Harbour (note: as a result of the survey, this area has since been discounted as being unsuitable for ecological enhancement);
- The Phase 2b area from Horizon Shine kiosk to Rhôs-on-Sea Harbour;
- The Phase 1 area from Horizon Shine and east to Porth Eirias;
- Old Colwyn (Phase 3) from Porth Eirias to Splashpoint; and
- Pensarn Beach.

These areas are presented in Drawing A.1 - A.3 in Appendix A.

3.1 Potential Enhancement Area

3.1.1 Upper Littoral Zone (LR.MLR)

An area to the west of Phase 2b (west of Rhôs-on-Sea Harbour) was identified prior to the walkover surveys as a potential candidate area for ecological enhancements. Rock revetment characterised the upper littoral zone as illustrated in Figure 3.1. Fauna and flora were largely absent on the revetment, with only occasional patches of ephemeral algae noted. Small pools of standing water were observed in between the rock arrangements but supported no visible intertidal fauna.

Figure 3.1: Green algae spp. Upper littoral zone

Source: Mott MacDonald Ltd, 2021

3.1.2 Mid Littoral Zone (LR.FLR.Rkp.Cor)

The mid littoral area immediately to the west of Rhôs-on-Sea Harbour was characterised by bedrock, boulders and cobbles. Further west shallow rockpools were present, colonised by *Corallina* algae and foliose red seaweeds (Figure 3.3). Notable fauna present included the gastropods common periwinkle (*Littorina littorea*) and dog whelk (*Nucella lapillus*), and the cnidaria, beadlet anemone (*Actinia equina*) (Figure 3.5). On exposed bedrock the common limpet (*Patella vulgata)* and acorn barnacle (*Semibalanus balanoides*) were numerous (Figure 3.4).

Figure 3.2: Enhancement area facing east towards Rhôs point

Source: Mott MacDonald Ltd, 2021

Figure 3.3: *Chondrus crispus, Littorina sp.* and *Corallina* sp.in the mid-littoral zone

Source: Mott MacDonald Ltd, 2021

Figure 3.4: *Patella vulgata* and *Semibalanus balanoides* in mid-littoral zone

Source: Mott MacDonald Ltd, 2021

Figure 3.5: Beadlet anemone (*Actinia equina*)

Source: Mott MacDonald Ltd, 2021

3.1.3 Lower Littoral Zone (LR.MLR.BF & LS.LSa)

Two biotopes characterised the lower littoral zone; littoral sand (LS.LSa) (Figure 3.6) and intermittent patches of large boulders and bedrock (LR.MLR.BF) (Figure 3.7). There was no evidence of infauna or epifauna on littoral sand, but sessile fauna observed in the mid littoral zone (acorn barnacle, common limpet etc.) were still abundant on bedrock and boulders in the lower littoral zone.

Figure 3.6: Lower littoral zone west end of survey area

Source: Mott MacDonald Ltd, 2021

Figure 3.7: Facing south-west from lower littoral zone

Source: Mott MacDonald Ltd, 2021

Figure 3.8: Facing north-east across mid to lower littoral zone from Rhôs point

Source: Mott MacDonald Ltd, 2021

3.2 Rhôs-on-Sea Harbour

3.2.1 Upper Littoral Zone (LS.LCS.Sh)

The upper littoral zone adjacent to the harbour comprised of shingle, cobble and fine sand (Figure 3.9). This biotope typically supports little biological diversity which was also observed here. No fauna was observed during the walkover survey.

Figure 3.9: Shingle and cobble upper littoral zone

Source: Mott MacDonald Ltd, 2021

Figure 3.10: Shingle and cobble upper with washed up fucoids

Source: Mott MacDonald Ltd, 2021

3.2.2 Mid Littoral Zone (LR.MLR.BF)

The mid to lower littoral zone of the harbour area was characterised by boulder rock substrata with dense fucoid coverage (Figure 3.11). Bladder wrack (*Fucus vesiculosus*) was observed to be the dominant species of fucoid, although toothed wrack (*Fucus serratus*) was present intermittently. Sessile fauna synonymous with this biotope, acorn barnacle and common limpet, were abundant on exposed bedrock and amongst the mosaic of fucoids.

Figure 3.11: Fucoids in the mid littoral harbour

Source: Mott MacDonald Ltd, 2021

Figure 3.12: Mid littoral zone harbour

Source: Mott MacDonald Ltd, 2021

3.2.3 Lower Littoral Zone (LS.LMu)

The lower shore towards the breakwater was primarily mud substrate (Figure 3.13). No epifauna or indications of infauna species were noted during the survey. Only a small proportion of the lower littoral zone was surveyed due to health and safety concerns relating to mudflats. However, there was no indication that biotope was any different further down the shore to that observed at the ecotone.

Figure 3.13: Lower littoral zone harbour

Source: Mott MacDonald Ltd, 2021

3.3 Phase 2b Area

3.3.1 Upper to mid littoral zone (LR.MLR & LS.LSa.FiSa.Po)

The immediate area adjacent to the sea wall was boulder rock substrate (LR.MLR) covered by a mosaic of ephemeral algae and small patches of acorn barnacles. This biotope quickly transitioned into littoral coarse sand (LS.LSa.FiSa.Po), which was uniform across the mid littoral region in the Phase 2b area. No epifauna was present on this biotope but casts from lugworm (*Arenicola marina*) were frequently observed along with the sand mason (*Lanice conchilega*) (Figure 3.15).

Patches of standing water were also located throughout the survey area predominantly around the mid littoral zone. Additionally, an area of mixed substrate comprising shingle, sand and clay was located on the mid littoral zone between the two groynes east of the Cayley kiosk (Figure 3.22).

3.3.2 Artificial Structures (rock groynes and outfall structures)

The curved rock groyne adjacent to Rhôs-on-Sea harbour was covered by dense fucoid and barnacle aggregations (Figure 3.16). Common periwinkles (*L. littorea*) and dog whelks (*N. lapillus*) were also numerous amongst the mosaic of fucoids. These structures held significantly more biomass than the adjacent biotopes, especially in the mid to lower littoral zone.

Two further rock groynes are located in the Phase 2b area in addition to the curved groyne adjacent to the harbour. Species present on these comprised barnacles, limpets, small numbers of *Littorina* spp., fucoids and ephemeral algae (Figure 3.20 and Figure 3.21).

The concrete outfall was dominated with barnacles and *Littorina* spp., with some ephemeral algae present at the end of the outfall. The concrete slipway adjacent to the Cayley kiosk was covered by green ephemeral algae but no fauna was observed in this instance.

Figure 3.14: Phase 2b mid littoral zone

Source: Mott MacDonald Ltd, 2021

Figure 3.15: Phase 2b area Sand mason worm tubes in the mid littoral zone

Source: Mott MacDonald Ltd, 2021

Figure 3.16: Curved groyne adjacent to the harbour

Source: Mott MacDonald Ltd, 2021

Figure 3.17: Boulder rock substrate with ephemeral algal coverage

Source: Mott MacDonald Ltd, 2021

Figure 3.18: Mixed substrate with ephemeral algae

Source: Mott MacDonald Ltd, 2021

Figure 3.19: Mixed substrate

Source: Mott MacDonald Ltd, 2021

Figure 3.20: Barnacles present on rock groynes

Source: Mott MacDonald Ltd, 2021

Figure 3.21: Rock groyne extending into the intertidal mid littoral zone

Source: Mott MacDonald Ltd, 2021

Figure 3.22: Mixed substrate with clay

Source: Mott MacDonald Ltd, 2021

3.3.3 Lower Littoral Zone (LS.LSa.FiSa.Po)

The lower littoral zone was again characterised by medium to fine sand (Figure 3.23). No epifauna was observed on this biotope but both sandworm (casts) and sand mason polychaetes were observed (Figure 3.25). Small, patchy, degraded formations of honeycomb worm (*Sabellaria alveolata*) on moderate energy littoral rock were located in the lower littoral zone extending from the end of the rock groyne (Figure 3.24).

Further mixed substrate comprising boulders, cobbles, shingle and sand are located out from the slipway adjacent to the Cayley kiosk, this forms the historic fish trap (Figure 3.26) and is characterised predominantly by barnacles and *Littorina* spp..

Figure 3.23: Barren sand on the lower littoral zone

Source: Mott MacDonald Ltd, 2021

Figure 3.24: Patches of *Sabellaria alveolata*

Source: Mott MacDonald Ltd, 2021

Figure 3.25: Phase 2b area Sand mason worm tubes in the lower littoral zone

Source: Mott MacDonald Ltd, 2021

Figure 3.26: Fish trap from a distance

Source: Mott MacDonald Ltd, 2021

3.4 Phase 1 Area (LS.LSa)

The Phase 1 area consisted entirely of littoral sand (LS.LSa) (Figure 3.27 and Figure 3.28) with no indication of additional biotopes present. Please note due to access restrictions to the Phase 1 intertidal area (relating to pier construction works), observations were conducted from the promenade. As such no details regarding intertidal fauna and flora species are presented here. However, it can be inferred based on the biotope that this area is largely devoid of epifauna with polychaete worms dominating the infauna community, as observed in mid to lower littoral zones in the Phase 2 intertidal area.

Figure 3.27: Barren littoral sand on the upper and mid shore facing west

Source: Mott MacDonald Ltd, 2021

Figure 3.28: Barren littoral sand on the upper and mid shore facing east

Source: Mott MacDonald Ltd, 2021

Figure 3.29: Low shore facing south towards the pier

Source: Mott MacDonald Ltd, 2021

3.5 Old Colwyn (Phase 3)

3.5.1 Upper to mid littoral zone (LS.LMx and LR.MLR)

The upper littoral zone in the phase 3 area comprised of shingle, cobble and mobile fine sand (Figure 3.30 & Figure 3.31). This biotope typically supports little diversity which was the case here. No fauna was observed during the walkover survey.

An area of the biotope moderate energy littoral rock (LR.MLR) was also located by Splashpoint at the mid littoral zone.

The sea wall and the large boulders at the outfall discharge point were covered by ephemeral algae and occasional patches of fucoids (Figure 3.32 & Figure 3.33)

Figure 3.30: Upper littoral zone Phase 3 area

Source: Mott MacDonald Ltd, 2021

Figure 3.31: Mixed substrate, upper littoral zone Phase 3

Source: Mott MacDonald Ltd, 2021

Figure 3.32: Outfall, Porth Eirias

Source: Mott MacDonald Ltd, 2021

Figure 3.33: Porth Eirias end

Source: Mott MacDonald Ltd, 2021

3.5.2 Mid Littoral Zone (LS.LSa)

The mid littoral zone was dominated by fine to medium sand substrate. No fauna or flora was observed during the walkover survey.

Figure 3.34: Facing west from the east end of Old Colwyn

Source: Mott MacDonald Ltd, 2021

Figure 3.35: Mid littoral zone, littoral fine sand

Source: Mott MacDonald Ltd, 2021

3.5.3 Lower Littoral Zone (LS.LSa.FiSa.Po & LS.LBR.Sab)

The lower littoral zone down to the fringe line was characterised by littoral fine to medium sand with indications of polychaete presence in the sediment (*A. marina* casts observed at the surface). A small *Sabellaria* reef[6] extending over an area of approximately 15m^2 was present at the extremity of the lower littoral zone. Wading bird species: oystercatcher (*Haematopus ostralegus*) and redshank (*Tringa tetanus*) were observed feeding amongst the reef.

Figure 3.36: facing east across the low shore

Source: Mott MacDonald Ltd, 2021

Figure 3.37: Small *Sabellaria alveolata* reef at the low shore

Source: Mott MacDonald Ltd, 2021

Figure 3.38: Small patch of *Sabellaria alveolata*

Source: Mott MacDonald Ltd, 2021

Figure 3.39: *Sabellaria alveolata*

Source: Mott MacDonald Ltd, 2021

3.6 Pensarn Beach (LS.LCS.Sh)

Pensarn Beach intertidal area is comprised entirely of pebbles and cobbles with intermittent patches of fine sand towards the fringe line (Figure 3.40 & Figure 3.41). No fauna was observed on this biotope. At the shingle ridge there was an area of salt tolerant grass (unidentified species) present (Figure 3.41), for further information on the ecology of this area please see Pensarn Beach Botanical Survey Report No.100374-MMD-00-XX-RP-N-0021, Mott MacDonald Ltd, 2021.

[6] Hendrick *et al*. 2006. *Sabellaria spinulosa* reef: a scoring system for evaluating 'reefiness' in the context of the Habitats Directive.

Figure 3.40: Shingle at Pensarn Beach

Source: Mott MacDonald Ltd, 2021

Figure 3.41: Mid to low shore at Pensarn

Source: Mott MacDonald Ltd, 2021

Figure 3.42: Shingle ridge at Pensarn Beach facing east

Source: Mott MacDonald Ltd, 2021

4 Summary and Conclusions

4.1 Summary

4.1.1 Biotopes

Seven different biotopes were recorded during the phase 1 intertidal walkover survey. By area, littoral sand was the dominant biotope covering the majority of the mid to lower littoral zone in the Phase 1-3 areas. No biotopes of principal importance were noted during the survey; a patchy, degraded formation of *Sabellaria alveolata* was noted at the lower extremity of the Phase 2b area and a small *Sabellaria alveolata* reef was noted in Old Colwyn with (the reef is of principal importance under Section 7 of the Environment (Wales) Act).

Despite two areas in Colwyn Bay (an area adjacent to Rhôs-on-Sea Harbour and Abergele roads) being classified as designated shellfish waters by Natural Resources Wales (NRW), there was no evidence of any significant aggregations of shellfish in the intertidal area. For a graphical representative of all biotopes observed during the walkover survey please refer to Drawings A.1, A.2 and A.3.

Table 4.1 provides a summary of all broad habitats observed during the walkover survey and associated species. For more information regarding the marine hierarchy classification system please refer The Marine Habitat Classification for Britain and Ireland Version 15.03[7].

Table 4.1: Summary of Biotopes and Species Observed

Phase	Biotopes present	Associated Species Observed
Enhancement Area		
	LR.MLR	Ephemeral algae
	LR.FLR.Rkp.Cor	• *Corallina* spp. • *Littorina littorea,* • *Nucella lapillus*, • *Actinia equina,* • *Patella vulgata,* • *Semibalanus balanoides*
	LR.MLR.BF	• *Patella vulgata,* • *Semibalanus balanoides*
	LS.LSa	No fauna was observed
Rhôs-on-Sea Harbour		
	LS.LCS.Sh	No fauna was observed
	LR.MLR.BF	• *Fucus vesiculosus,* • *Fucus serratus,* • *Patella vulgata,* • *Semibalanus balanoides,*
	LS.LMu	No fauna was observed
Phase 2b Area		

[7] JNCC (2015) The Marine Habitat Classification for Britain and Ireland Version 15.03. [21.05.2021]. Available from: https://mhc.jncc.gov.uk/

Phase	Biotopes present	Associated Species Observed
	LR.MLR	• ephemeral algae • *Semibalanus balanoides* • *Sabellaria alveolata*
	LS.LSa.FiSa.Po	• *Lanice conchilega* • *Arenicola marina*
Phase 1 Area		
	LS.LSa	No fauna was observed
Old Colwyn (Phase 3)		
	LS.LMx	No fauna was observed
	LR.MLR	No fauna was observed
	LS.LSa	No fauna was observed
	LS.LSa.FiSa.Po	• *Lanice conchilega* • *Arenicola marina*
	LS.LBR.Sab *small reef	*Sabellaria alveolata*
Pensarn Beach		
	LS.LCS.Sh	No fauna was observed

Source: Mott MacDonald ltd, 2021

4.1.2 Species

Species recorded during the walkover survey were consistent with moderately exposed shores. The area identified for potential habitat enhancement (west of Rhôs-on-Sea Harbour) works showed the greatest diversity and density of species (Figure 3.1 & Figure 3.8). The biotopes in areas Phase 1-3 were largely impoverished with the exception of dense mosaics of fucoids and acorn barnacles on rock groynes extending down the foreshore. It must be noted that the infauna community within the littoral sediment is likely underrepresented as no samples were taken.

4.2 Conclusions

The intertidal community was found to be entirely consistent with moderate to high energy coastlines. Where hard substrate was present i.e. artificial structures, large boulders and rock found common sessile intertidal fauna associated with northern latitudes of the British Isles (whelks, acorn barnacles, common limpet) were well established, most notably to the west of Rhôs-on-Sea Harbour.

The recharge works would permanently displace sessile communities that have established on the remaining revetment rock and proportions of the groynes in the upper littoral zone in the Scheme area. Mobile sand shores in the upper littoral zone are largely impoverished of fauna compared to hard substrates, particularly in areas of high mobility and exposure such as this. It is unlikely that an intertidal community would be established once the proposed recharging of the beach has been completed, as conditions are unconducive (high mobility and exposure) for the infauna communities observed further down the shore to recolonise the area. As such it can be assumed that there will be a net loss in biodiversity (albeit small) without appropriate intervention. However, the beach is being returned to a condition more similar to its pre-Victorian state (prior to the construction of hard defences when mobile sands were present), and the loss of biodiversity is from habitats that would not naturally occur in this area.

Littoral shingle and gravel shores observed at Pensarn beach are synonymous with low diversity due the constant reworking of the sediment by tides and exposure. These conditions make coarse sediment beaches inhospitable for most intertidal species. Survey results outlined in Section 3.6 are consistent with this synopsis and can therefore conclude that the pipeline construction works would have no negative impacts on the intertidal habitat found on Pensarn beach. Habitats above the MHWS have been covered within the Pensarn Beach Botanical Survey Report No.100374-MMD-00-XX-RP-N-0021, Mott MacDonald Ltd, 2021.

A proportion of the Scheme falls within a designated shellfish area, however there was no evidence from the survey of any viable shellfish beds in the intertidal area. As the surveys were not conducted on the highest astronomical tide range it is possible that shellfish beds could be exposed on spring tides. However, it is likely these would be situated outside the Project AoI and therefore no effects are expected.

A. Drawings

Drawing A.1: Colwyn bay Waterfront Project Phase 2b Phase 1 Habitat Map 100374-MMD-00-XX-DR-N-0016, Phase 2b area

Potential Habitat Enhancement Area

Colwyn Bay Waterfront Project - Phase 2b Area

Colwyn Bay Waterfront Project - Phase 1abc Areas

Location Map

Key to Symbols

- Patchy degraded formation of *Sabellaria alveolata*

Joint Nature Conservation Committee (JNCC) Marine Habitat Classification

- LR - Littoral rock (artificial structures)
- LR.FLR.Rkp.Cor - Coralline crust-dominated shallow eulittoral rockpools
- LR.MLR - Moderate energy littoral rock
- LR.MLR.BF & LS.LSa - Barnacles and fucoids on moderately exposed shores & Littoral sand
- LR.MLR.BF - Barnacles and fucoids on moderately exposed shores
- LS.LCS.Sh.BarSh - Barren littoral shingle
- LS.LMu - Littoral mud
- LS.LMx - Littoral mixed sediment
- LS.LSa - Littoral sand
- LS.LSa.FiSa.Po - Polychaetes in littoral fine sand
- Standing water

Notes

1. For information only, not for construction.
2. Contains OS data © Crown Copyright and database right 2020
Contains data from OS Zoomstack, Maxar, Microsoft

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	21/08/21	SL	For information	CW	NH

Mott MacDonald House
5 Woodland Road West
Colwyn Bay
LL29 7DH
T +44 (0) 117 906 9500
W www.mottmac.com

Client

Conwy County Borough Council
Environment, Roads & Facilities
Mochdre Offices
Colwyn Bay
Conwy
LL32 8DU

Title

Colwyn Bay Waterfront Project Phase 2b
Phase 1 Habitat Map
Page 1 of 3

Designed	A Jones	AJ	Eng Check	C Williams	CW
Drawn	S Li	SL	Coordination	N Spofforth	NS
GIS Check	S Anstice	SA	Approved	N Haines	NH

Scale at A3	Status	Rev	Security
1:7,500	INF	P1	STD

Drawing Number
100374-MMD-00-XX-DR-N-0016

0 100 200 300 400 500 Metres

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Drawing A.2: Colwyn bay Waterfront Project, Phase 2b Phase 1 Habitat Map 100374-MMD-00-XX-DR-N-0017, Old Colwyn and Phase 1 areas

Colwyn Bay Waterfront Project - Phase 2b Area

Colwyn Bay Waterfront Project - Phase 1abc Areas

Old Colwyn Coastal Defence and Active Travel

Location Map

Key to Symbols

- Patchy degraded formation of *Sabellaria alveolata*

Joint Nature Conservation Committee (JNCC) Marine Habitat Classification

- LR - Littoral rock (artificial structures)
- LR.MLR - Moderate energy littoral rock
- LS.LBR.Sab - Littoral *Sabellaria* honeycomb worm reefs
- LS.LMx - Littoral mixed sediment
- LS.LSa - Littoral sand
- LS.LSa.FiSa.Po - Polychaetes in littoral fine sand

Notes

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MOTT MACDONALD

Mott MacDonald House
5 Woodland Road West
Colwyn Bay
LL29 7DH
T +44 (0) 117 906 9500
W www.mottmac.com

Client

CONWY
CYNGOR BWRDEISTREF SIROL
COUNTY BOROUGH COUNCIL

Conwy County Borough Council
Environment, Roads & Facilities
Mochdre Offices
Colwyn Bay
Conwy
LL32 8DU

Title

Colwyn Bay Waterfront Project Phase 2b
Phase 1 Habitat Map
Page 2 of 3

Designed	A Jones	AJ	Eng Check	C Williams	CW
Drawn	S Li	SL	Coordination	N Spofforth	NS
GIS Check	S Anstice	SA	Approved	N Haines	NH

Scale at A3	Status	Rev	Security
1:7,500	INF	P1	STD

Drawing Number

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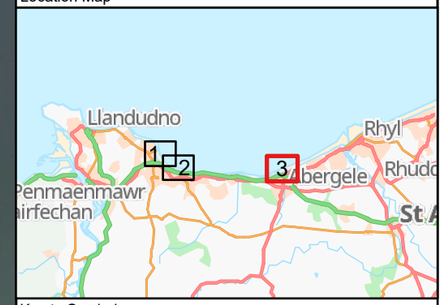
Drawing A.3: Colwyn bay Waterfront Project Phase 2b, Phase 1 Habitat Map 100374-MMD-00-XX-DR-N-0018, Pensarn Beach area

Pensarn Beach

Location Map



Key to Symbols

Joint Nature Conservation Committee (JNCC) Marine Habitat Classification

LS.LCS.Sh - Shingle (pebble) and gravel shores

Notes

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MOTT MACDONALD

Mott MacDonald House
5 Woodland Road West
Colwyn Bay
LL29 7DH
T +44 (0) 117 906 9500
W www.mottmac.com

Client

CONWY
CYNGOR BWRDEISTREF SIROL
COUNTY BOROUGH COUNCIL

Conwy County Borough Council
Environment, Roads & Facilities
Mochdre Offices
Colwyn Bay
Conwy
LL32 8DU

Title

Colwyn Bay Waterfront Project Phase 2b
Phase 1 Habitat Map
Page 3 of 3

Designed	A Jones	AJ	Eng Check	C Williams	CW
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Scale at A3	Status	Rev	Security
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Drawing Number
100374-MMD-00-XX-DR-N-0018

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Appendix 9.5 – Updated Over Wintering Bird Survey Report

MOTT MACDONALD

Colwyn Bay Waterfront Project

Over Wintering Bird Survey Report

August 2021

Mott MacDonald
Mott MacDonald House
5 Woodland Road West
Colwyn Bay LL29 7DH
United Kingdom

T +44 (0)1492 534601
mottmac.com

Environment Roads & Facilities
Conwy County Borough Council
Mochdre Council Offices

Colwyn Bay Waterfront Project

Over Wintering Bird Survey Report

August 2021

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	07/01/20	K Bowman	L Woolley	J Bates	First Issue
B	11/02/20	K Bowman	L Woolley	N Shelton	Second Issue
C	16/08/21	K Doneo	C Williams	N Haines	Third Issue, for supporting Phase 2b of the Colwyn Bay Waterfront project

Document reference: 410895-MMD-N-R-00-XX-1700

Information class: Standard

Contents

Executive summary

Mott MacDonald Ltd has been commissioned by Conwy County Borough Council (CCBC) to complete over-wintering bird surveys relating to the Colwyn Bay Waterfront Project, to inform two coastal defence and promenade improvement schemes – Phase 3 (the Old Colwyn Coastal Defence and Active Travel Scheme) and Phase 2b.

Surveys were undertaken over two periods; from November 2019 to January 2020 and from February to April 2021. The surveys provide information on overwintering bird communities present as well as any species on spring passage (migrating from breeding to wintering grounds) to identify any potential for ornithological impacts and therefore constraints that may be imposed upon the proposed developments and any mitigation requirements. The survey method applied was The British Trust for Ornithology's Wetland Bird Survey, 'look-see' methodology with the entire Scheme survey area was covered during the survey period.

A total of 20 species were recorded, including common scoter (*Melanitta nigra*), which are a species listed as a feature of interest for the adjacent Liverpool Bay Special Protection Area (SPA).

Important habitat areas identified within the survey area for overwintering birds include the following:

- Intertidal areas;
- Sea; and
- Rhôs-on-Sea Breakwater Area.

The number and richness of bird species were consistent throughout all surveys, including between the 2019/20 winter and late winter 2021. Species recorded were also typical of the habitats located within the survey area.

The offshore sea area appears to be important for SPA designated species: common scoter, where significant numbers were observed throughout the over wintering period.

The breakwater area appeared to support a greater number of roosting species, particularly during high tide. However, the numbers of birds supported by this area was not considered significant.

Whilst there will be some effects from construction works, these are considered to be low compared to existing background levels and for a limited period of time.

Recharge works are considered to be the element likely to cause the biggest potential effect but will be undertaken outside of the core wintering bird period and any associated impacts are likely to be temporary in nature when very low numbers of birds are expected to be present and using the intertidal area.

Due to the large numbers of common scoter recorded offshore, further consideration of impacts to these species will be required in the form of a HRA, as this species is listed as a feature of interest of the Liverpool Bay SPA.

The recommendations set out within this report are based upon the proposed works and to provide general recommendations and mitigation regarding overwintering birds, particularly SPA species in order to safeguard areas and key populations of greatest importance.

1 Introduction

1.1 Project background and site location

Mott MacDonald Ltd has been commissioned by Conwy County Borough Council (CCBC) to complete over-wintering bird surveys relating to Phase 2b and 3 of the Colwyn Bay Waterfront Project (see Figure 1.1).

Figure 1.1: Colwyn Bay Waterfront Project location plan

Source: DigitalGlobe, Microsoft, Earthstar Geographics | Esri UK, Esri, HERE, Garmin, METI/NASA, USGS

1.1.1 Colwyn Bay Waterfront Project

The Victorian built coastal defences around Colwyn Bay from Rhôs-on-Sea in the west to Old Colwyn in the east have suffered from undermining, corrosion, partial collapses and degradation with frequent overtopping events occurring at Spring Tides.

The Colwyn Bay Waterfront Project was introduced in 2007 by CCBC, who sought to address both the deteriorating coastal defences as well as public facilities to spark regeneration of the area.

The various components of the Colwyn Bay Waterfront Project are :

- 'Colwyn Bay Waterfront Project Phase 1abc' (this phase has been completed);
- 'Colwyn Bay Waterfront Project Phase 2b' to the west; and
- 'Old Colwyn Coastal Defence and Active Travel Scheme' (also known as Phase 3) to the east.

The bird surveys in this report cover the Old Colwyn and Phase 2b areas, shown in Figure 1.2.

Figure 1.2: Scheme Location within Colwyn Bay

Source: 'ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community'. Note The completed Colwyn Bay Waterfront Phase 2a Scheme area straddles the Phase 1 and Phase 2 areas.

The national grid references for the western and eastern boundaries of each Scheme are:

- The Colwyn Bay Waterfront Project Phase 2b west (285746, 378889) to east (287079, 378699); and
- Phase 3 Old Colwyn Coastal Defence and Active Travel Scheme west (284270, 380524) to east (284975, 379499).

A summary of the works completed at each stage to date is provided in Table 1.1.

Table 1.1: Colwyn Bay Waterfront Project summary

Phase	Stage	Description	Completion date
1	General	Phase 1 of the scheme was carried out in three stages covering approximately 35,000m^2. The site was located within the central section of the frontage either side of Victoria Pier from the section of seafront in the vicinity of Marine Road to the west, to the section of seafront parallel to the J22 eastbound slip road of the A55 Expressway to the east.	October 2014
1	a	Phase 1a of the scheme encompassed engineering works and environmental improvements. The engineering works comprised a 150m rock groyne structure perpendicular to the shoreline, with a short length of linear rock revetment to the east of the groyne, along with the construction of a sheet piled wall. A short section of concrete stepped revetment was also constructed along the western edge of the promenade. Existing slipway access at this location was raised and extended to follow the design of the new structures.	Engineering works – March 2012 Environmental works – April 2013

Phase	Stage	Description	Completion date
		The environmental works comprised the construction of Porth Eirias, a new multi-use water sports building, and landscaping works.	
1	b	The coastal defence works primarily comprised beach recharge to the west of Porth Eirias, to bring beach levels up to the level of the existing promenade (approximately 5.00m above ordnance datum (AOD)) but below the existing seawall crest (at approximately 6.15m AOD). Beach recharge was also undertaken between Cayley Promenade and Eirias Park, sourced from Liverpool Bay. Promenade enhancement was carried out to the west of the completed Porth Eirias Phase 1a works up to the pier area and extending below the Network Rail over-bridge as far as the interface with the train station. Enhancement works included improvements to the promenade consisting of; stepped revetment structures, 'headland' structures, access ramp, cycle ramp, car parking, promenade raising, secondary sea defence wall, streetlighting, street furniture and new town centre link works.	Coastal defence works – May 2013 Promenade enhancement works – October 2014
1	c	Coastal defences consisting of beach recharge (totalling 220,000m^3 dredged beach material) and associated infrastructure works, including extending surface water outfalls, repairs to the existing seawall and removal and replacement of rock armour. Works were completed in parallel with the Phase 1b promenade enhancements.	Coastal defence works – October 2014
2/1	*a/d*	*Note: Some reports refer to 1d, while others refer to 2a, these phases are one and the same.* Regeneration of two areas of coastline (Areas A and B) located between Victoria Pier and Cayley Embankment. Area A extended approximately 430m westwards from Victoria Pier to Princess Court apartments. Works comprised improved recreational opportunities and enhanced coastal defences across the site. This involved widening and raising the existing promenade and highway by constructing a new seawall approximately 7m seaward of the existing seawall, with three new headlands. Area B extended approximately 420m westwards from the Princess Court apartments to Rydal boat store near Cayley Embankment. Works included improved slipway access, beachfront access compliant with the Equalities Act 2010, car parking changes, seating, planting, railings, street furniture and lighting changes.	September 2017
Splashpoint		This scheme comprises the construction of a short section of 30m deep rock revetment against the seawall at the location identified as being at highest risk of imminent collapse – the easternmost section of the promenade (where a revetment is currently absent) known as 'Splashpoint'.	Ongoing (anticipated to be completed prior to construction of Phase 2 commencing)
3 (Old Colwyn Coastal Defence and Active Travel Scheme)		This phase comprises the construction of a 32m deep rock revetment along the base of the seawall from Porth Eirias to join with the Splashpoint Project to the east with associated outfall extensions and new pedestrian accesses to the beach. It also includes active travel improvements to include new cycleway layouts, improved pedestrian access areas, improved lighting, new	Anticipated 2023 (eastern half, western half required funding).

Phase	Stage	Description	Completion date
		handrailing and improved signage along with other promenade improvements.	
2	b	Current Scheme, see 1.1.2 below	Anticipated May 2023

Source: Adapted from Project Appraisal Review and Update Report, CCBC, 2018

1.2 Scheme descriptions

1.2.1 Colwyn Bay Waterfront Project Phase 2b

The proposed scope of work is anticipated to comprise a combination of coastal defence and promenade improvements. The Environmental Statement red line boundary for the scheme is shown in Figure 1.3 below and comprises both coastal and promenade works.

Figure 1.3: Colwyn Bay Waterfront Project Phase 2b red line boundary

Source: Mott MacDonald Limited, Adapted from Red Line Boundary Drawing 100374-MMD-00-XX-DR-Z-0001

The proposed scope of coastal and promenade works include:

1.2.1.1 Sea wall repairs

Minor repairs (e.g. grouting, re-pointing, coping repairs, filling of voids) to the existing sea wall from Rydal Boat store boundary with the Phase 2a area to the southern boundary of Rhôs-on-Sea Harbour. Works would be completed both from the promenade and from the intertidal area (depending on the repair needed).

1.2.1.2 Terminal groyne works

The terminal groyne adjacent to Rhôs-on-Sea harbour would be raised by approximately 1m along its length and an additional arm would be added. Construction of this would re-use 9-10,000m^3 existing rock revetment currently located against the sea wall across the Phase 2b area and present within existing groynes (which would otherwise be redundant following beach recharge activities). This is needed to prevent the beach recharge activities causing siltation of the Rhôs-on-Sea harbour.

1.2.1.3 Outfall extensions and groynes

A total of six Welsh Water surface water outfalls are anticipated to be buried by the beach recharge. It is currently understood that three outfalls would be extended by a new section of pipe, encased by concrete for protection.

The three remaining outfalls are expected to be either diverted within the promenade to one of the retained extended outfalls or protected by a gabion basket to allow continued flow beneath the new beach surface level.

1.2.1.4 Beach recharge

Beach recharge activities would involve the importation and placement of approximately 1,000,000t (~666,000m^3) of dredged sand material between the Rhôs-on-Sea terminal groyne to the west round to the existing slipway adjacent to the western junction of Cayley Promenade with Rhôs Promenade to the east to bring levels up to match the design profile of the Phase 1 works (5mAOD). Recharge would be then tapered off from this point eastwards to tie in with levels in the vicinity of the Horizon Shine Kiosk.

Dredged sand is transported via a floating pipeline, which would be constructed and deconstructed on Pensarn beach, which is eastwards along the coast between Colwyn Bay and Rhyl. Beach recharge works and associated pipeline construction would be completed outside of the core wintering bird season.

In addition, the Scheme would also appropriately include for the ‘topping-up’ of sand levels between the Horizon Shine Kiosk and the new truncated pier location.

The design profile of the new beach would comprise an upper berm of 20m width and 1 in 40 slope to seaward, which would abut the existing sea wall at a level of +5.0m AOD. From the seaward edge of the berm, the beach would be placed at a gradient of approximately 1 in 30 until it meets the existing beach at a level typically between -2.0 and -3.0 AOD.

Beach management activities between the pier and Porth Eirias would carry on as usual under the existing marine licence for this purpose.

1.2.1.5 Promenade works

The promenade improvement works are currently anticipated to comprise:

- A 2.2m wide pedestrian-only zone;
- A 4m wide shared surface with health markers at 50m intervals;
- Designated picnic / seating areas;
- Activity zones;
- “Rhôs” feature letters and artwork;
- Pedestrian links across the highway & promenade;
- Intermediate links across promenade & shared surface;
- New surface finishes;

- Landscaping (including appropriate planting / soft landscaping);
- Streetlighting; and
- Street furniture / features.

1.2.1.6 Future maintenance

Following discussion with CCBC on the current maintenance of a similar scheme, it is currently anticipated that future maintenance action would comprise:

- Reactive maintenance and repair of structures, groynes, and steps as identified following routine inspections;
- Routine maintenance and repair of promenade including pavement, drainage system, and vegetation management of soft landscaped areas;
- Cleaning and maintenance of slipways, with a suitable inspection regime;
- Maintenance of landscape features such as benches, guards, and handrails;
- Beach management – redistribution of sand on up to an annual basis, depending on weather conditions; and
- Monitoring of beach levels across the Scheme area.

1.2.1.7 Proposed works programme

The programme is currently anticipated to be:

- Detailed design of the Scheme completed by Summer 2021;
- Mobilisation and starting works by end of March 2022; and
- A continuous construction period of approximately 14 months would be split into phases in the following order (to be confirmed once a contractor has been engaged):
  - Repairs to sea wall, modifications to terminal rock groyne and extension of outfalls;
  - Beach recharge; and
  - Promenade works.

1.2.2 Old Colwyn Coastal Defence and Active Travel Scheme

The proposed scope of work comprises a combination of coastal defence, promenade and active travel improvements (see Figure 1.4 for a location plan). Works include the following key components:

- The construction of a rock revetment approximately 30m in cross-sectional width and 1.2km in length, with associated modifications to existing surface water outfalls on the beach to extend them through the new revetment;
- A new access build-out area to be constructed in the western half of the Scheme area which would have several functions, including providing a greater area for pedestrian access; Equality Act compliant ramp access and stepped access to the beach, along with landscaped seating steps at varying levels, to the beach access;
- New pedestrian accesses through the proposed revetment to comprise three sets of beach access steps perpendicular to the linear rock revetment;
- A dedicated fishing platform in the Splashpoint Area to keep anglers at a safe distance from active travel routes:
- The raising of the Promenade to the west of Rotary Way and the raising of the Promenade and highway to the east of Rotary Way with associated access provision;
- Pedestrian and cycle path improvements, pedestrian crossings and improved Promenade access;

- Improved picnic area in a landscaped garden setting and an adjacent outdoor classroom area; and
- Improvements in parking provision, street furniture and lighting and provision of space for a new concession building.

Figure 1.4: Old Colwyn Coastal Defence and Active Travel Scheme red line boundary and areas of permanent construction (yellow hatching, green hatching relates to ecological mitigation areas)

Source: Old Colwyn Coastal Defence and Active Travel Scheme ES, July 2020

1.3 Ecology Context

1.3.1 Site Habitats

The survey area briefly comprises the following:

- Intertidal area, including groynes and the harbour breakwater;
- Sea;
- Promenade; and
- Buildings and structures lining the promenade.

1.3.1.1 Phase 2b

The intertidal area at Colwyn Bay has a large tidal range (up to c.10m) and comprises predominantly littoral coarse sand with lugworm and sand mason worm casts present in the Phase 2b area. A breakwater and curved rock groyne are located by the harbour along with a further two rock groynes in the area. A concrete slipway is present along with a concrete outfall. The upper littoral zone of the Phase 2b area comprises boulder rock substrate with ephemeral algae coverage. Standing water along with boulders and shingle are also present in the Phase 2b area comprising a historic fish trap. The lower littoral zone comprises medium to fine sand with polychaete casts present along with small patches of *Sabellaria alveolata* reefs.

1.3.1.2 Old Colwyn Coastal Defence and Active Travel Scheme

The Old Colwyn area comprises shingle, cobbles and mobile fine sand in the upper littoral zone and is backed by a vertical sea wall. Large boulders surround an outfall discharge point at Splashpoint and are covered in ephemeral algae and patches of seaweed. The mid littoral zone comprises fine to medium sand with no fauna or flora observed.

The lower littoral zone comprised predominantly fine to medium sand with evidence of polychaetes. *Sabellaria alveolata* reef were noted at the extremity of the lower littoral zone. Rock groynes are also present along with a further concrete outfall.

1.3.2 Liverpool Bay SPA

The Schemes are both located in close proximity to the Bae Lerpwl/ Liverpool Bay inshore Special Protection Area (SPA) and Important Bird Area (IBA). For the Colwyn Bay Waterfront Project Phase 2b Scheme in particular it is anticipated that the beach recharge construction activities including boat and temporary floating pipeline will take place within the SPA boundary.

The SPA covers an area of approximately 252,758ha and regularly supports approximately:

- 6.89% of the British populations of red-throated diver (*Gavia stellata*)
- 10.31% of the biogeographical population of common scoter (*Melanitta nigra*),
- 6.84% of the British population of little tern (*Sternula albifrons*),
- 1.8% of the British population of common tern (*Sterna hirundo*); and
- little gull (*Hydrocoloeus minutus*) (the population percentage of which is not given).

In terms of use of the area, the red-throated diver, common scoter and little gull are wintering species, whilst the little tern and common tern use the area in summer.

1.3.3 Important Bird Area

Although a non-statutory designation, the importance of the area for wild birds is also recognised by it lying within the North Wales Coast Important Bird Area (IBA)[2].

1.4 Purpose of this Report

The purpose of this report is to set out the results of the over-wintering bird surveys undertaken from November 2019 to January 2020 and February to April 2021; to assess the potential impacts from these two Schemes, as far as is reasonably possible based on current understanding of the designs. Recommendations are provided for mitigation where necessary.

[2] Bird Life International, 2021. North Wales Coast IBA [Online] Available at: BirdLife Data Zone [Accessed July 2021]

2 Methodology

2.1 Scope of the Surveys

Surveys were undertaken over the 2019-20 winter period, with additional surveys undertaken from February to April 2021 to capture the spring passage period. The survey area extended from the Old Colwyn Coastal Defence and Active Travel Scheme area to the east (including 500m to the east to cover the potential zone of influence of the proposed works) and the Colwyn Bay Waterfront Project Phase 2b area to the west. The total survey area for Old Colwyn Coastal Defence and Active Travel Scheme was approximately 1.4km and the total survey area for the Colwyn Bay Waterfront Project Phase 2b was approximately 1.5km.

There was some overlap into the Phase 1 Colwyn Bay Waterfront Project area during the 2019/20 surveys and these results have been included in Appendix A for completeness.

2.2 Wetland Bird Survey (WeBS) Methodology

The British Trust for Ornithology's Wetland Bird Survey, 'look-see' methodology[3] was implemented for the surveys. The method involves surveying all of a predefined area.

The coast was walked within two hours either side of high and low tide and undertaken during falling and rising tidal states to obtain a good representation of the bird species present during each part of the tidal cycle.

The coast was walked at a constant pace with surveyors stopping every 150m to scan the immediate bay and sea area.

Species identified by sight or sound were counted and recorded separately for each feature along the coastline using an appropriate digital mobile device. Particular attention was paid to the presence of over-wintering SPA species and notes taken on behaviour, location, time spent at location and existing disturbance levels and any species responses to these, where relevant.

In order to maintain a relatively consistent ability to detect bird activity, the surveys were conducted where practicable in optimal or near optimal conditions and avoiding periods of heavy rain and/or strong wind (above Force 4) wherever possible.

2.3 Survey Details

Five survey visits were undertaken over the 2019/20 winter period. Additional surveys of the Colwyn Bay Waterfront, from Splashpoint in Old Colwyn to Rhôs-on-Sea harbour were undertaken in 2021 to confirm the 2019/20 results and capture the spring passage period (when birds migrate from breeding to wintering grounds) details of these have been provided within Table 2.1.

[3] Bibby, C.J., Burgess, N.D., Hill, D.A. & Mustoe, S. 2000. Bird Census Techniques. Second Edition. Academic Press, London.

Table 2.1: Survey details

Scheme	Date	Start/ finish time (BST)	Total cloud cover (Oktas)	Wind speed (Beaufort Scale) & direction	Precipitation	Surveyors
2019/20 Surveys						
Old Colwyn Coastal Defence and Active Travel Scheme	22nd November 2019	11am-3pm	0	1 SE	None	K. Doneo & K. Howe
Colwyn Bay Waterfront Project Phase 2b	6th December 2019	10am-2pm	0	2 NW	None	K. Doneo & C. Taylor
Old Colwyn Coastal Defence and Active Travel Scheme & Colwyn Bay Waterfront Project Phase 2b	9th December 2019	10am-2pm	0	3 N	None	K. Doneo & C. Taylor
Old Colwyn Coastal Defence and Active Travel Scheme & Colwyn Bay Waterfront Project Phase 2b	6th January 2020	11am-1.30pm	0	2 WSW	None	K. Doneo A. Crowl
Old Colwyn Coastal Defence and Active Travel Scheme Colwyn Bay Waterfront Project Phase 2b	16th January 2020	10am -2pm	0	3 SSE	None	K. Doneo B. Gray
2021 Surveys						
Splashpoint to Rhôs-on-Sea	26th February 2021	10.30am – 2.15pm	3	1 SSW	None	K. Doneo S. Binney
Splashpoint to Rhôs-on-Sea	23rd March 2021	8.30am – 12.30pm	4	1 SSW	None	K. Doneo S. Binney

Splashpoint to Rhôs-on-Sea	28th April 2021	10.00am – 2.00am	2	3 NE	None	K. Doneo S. Binney

Source: Mott MacDonald, 2021.

2.4 Survey Limitations

- The absence of a species is not conclusive proof that a species is not present or that it will not be present in the future. However, the field surveys do provide a good comprehensive understanding of wintering and passage bird species that exist within the Schemes footprint and surrounding areas which are likely to be impacted by the proposed works;
- Surveys were carried out in daylight hours only and therefore species behaviour and locations during the hours of darkness and/or twilight have not been recorded; and
- The tidal state during the April survey was choppy and therefore sea dwelling bird species (diving ducks, loons etc.) detectability was considered as low.

3 Survey Results

Results of the 2021 surveys are set out within Section 3.1 in relation Phase 2b of the Colwyn Bay Waterfront Project (Figure 1.3).

In Section 3.2 the 2019/20 survey results are set out separately for the Colwyn Bay Waterfront Project Phase 2b area, and in Section 3.3 for the Phase 3 Old Colwyn Coastal Defence and Active Travel Scheme area. SPA species have been noted in **bold**.

Please note that survey results for the Phase 1 a,b,c area (intervening land between Phase 3 and Phase 2b) are included in Appendix A for context only but are not considered below as it falls outside of the scope of this report.

3.1 2021 Survey Results

Results of the surveys undertaken in 2021 to confirm the 2019/20 surveys and capture the spring passage period are provided in Table 3.1 to Table 3.3. Results are reported in relation to the distance from the Phase 2b Red Line Boundary (RLB).

Table 3.1: Visit 1 – 26th February 2021

Species	Distance from Phase 2b RLB	Count	Field observations
Black-headed gull	Within.	Max: 12 Avg: 8 Min: 4	Observed loafing from within the Phase 2b area on the intertidal zone to c.1km east on the intertidal zone (within the Phase 1 area)
Common scoter	450m and up to 2.0km	Max: 1000 Avg: 257 Min: 1	Observed in a large raft of 500-1000 birds near the wind farm (c.2km). Smaller rafts of 5 and 6 birds were observed within 500m. A further 28 individuals were located c.800m away to the east (within the Phase 1 area).
Cormorant	50m	Max: 7 Avg: 5 Min: 1	Individuals were observed roosting, loafing and feeding. The nearest bird was observed roosting on the harbour breakwater within 50m of the RLB with a further 7 birds within 150m scattered across the intertidal area loafing and feeding.
Great black-backed gull	500m	Min: 1 Avg: 1 Max: 1	One individual observed loafing at sea c.500m from the RLB.
Great crested grebe	300m	Max: 2 Avg: 1.5 Min: 1	Two individuals observed loafing at sea c.1km east of the RLB (out from the Old Colwyn area) with a further one located c.300m east on the intertidal zone (in the phase 1 area).
Herring gull	Within and up to 550m	Max: 10 Avg: 10 Min: 4	Predominantly observed loafing at sea c.500m away. Four individuals were observed roosting at the base of the sea wall and a further 8 were also observed within the RLB loafing.
Lesser Black-backed gull	150m	Min: 1 Avg: 1 Max: 1	Observed loafing on the harbour breakwater.
Oystercatcher	50m	Min: 50 Avg: 50 Max: 50	Observed roosting on the harbour breakwater.

Species	Distance from Phase 2b RLB	Count	Field observations
Razorbill	250m	Min: 1 Avg: 1 Max: 1	One bird loafing at sea.
Turnstone	250m	Max: 20 Min: 9 Avg: 14	Observed roosting on the harbour breakwater.

Source: Mott MacDonald Limited, 2021

Table 3.2: Visit 2 – 23rd March 2021

Species	Distance from Phase 2b RLB	Count	Field observations
Common gull	Within	Min: 2 Avg: 2 Max: 2	Observed roosting in the intertidal area within the Phase 2b RLB.
Common scoter	300m at closest and up to 1.5km	Max: 250 Min: 4 Avg: 74	58 birds were observed feeding within 500m of the Phase 2b RLB with a further 4 located within 300m (to the east, within the Phase 1 area). A larger raft of 250 birds was observed feeding 1km away, out from the Old Colwyn area and a smaller raft of 50 birds was observed feeding c.700m awa (out from the Phase 1 area).
Cormorant	<50m at closest and 2km (at furthest – within Old Colwyn area)	Max: 4 Min: 1 Avg: 2	Individuals were observed roosting and feeding scattered throughout the intertidal area from Rhôs Point to Old Colwyn.
Great black-backed gull	400m	Min: 1 Avg: 1 Max: 1	One individual observed roosting on the intertidal area off Rhôs Point (west of the harbour).
Great crested grebe	250m at closest and up to 3km (spread throughout the Phase 1 and Old Colwyn areas)	Max: 4 Min: 1 Avg: 2	Four birds observed feeding within 250m of the Phase 2b RLB. All other birds were observed feeding on the intertidal areas of the Phase 1 and Old Colwyn areas during the high tide.
Herring gull	Within co	Max: 68 Min: 1 Avg: 18	Observed loafing, feeding and roosting within the Phase 2b RLB in groups of c.14 birds. 25 birds were observed loafing at sea c.350m away. One bird was observed at the western boundary of the Phase 1 area, construction vehicles were observed on the beach throughout the Phase 1 area and no birds were observed here. Larger numbers of birds were observed throughout the Old Colwyn area 1-2km from the Phase 2b RLB feeding and loafing. These were c.30-100m from the sea wall.
Lesser Black-backed gull	Within	Min: 1 Avg: 1 Max: 1	All observed within the Phase 2b RLB towards the lower shore roosting and feeding.

Species	Distance from Phase 2b RLB	Count	Field observations
Oystercatcher	<50m and up to 3km.	Max: 52 Min: 4 Avg: 22	30 birds were observed roosting upon the breakwater area and feeding within the intertidal area at Rhôs Point with the closest observed feeding in the harbour <50m away 52 birds were observed feeding out from Splash Point, in the Old Colwyn area (c.3km from the Phase 2b RLB).
Redshank	<30m	Min: 12 Avg: 12 Max: 12	Observed feeding in the harbour.
Starling	250m	Min: 30 Avg: 30 Max: 30	Observed on the harbour revetment.
Turnstone	3km	Max: 21 Min: 5 Avg: 13	Observed feeding on the intertidal area within the Old Colwyn area (c.200m from the seawall).

Source: Mott MacDonald Limited, 2021

Table 3.3: Visit 3 – 28th April 2021

Species	Distance from Phase 2b RLB	Count	Field observations
Common scoter	1km	Min: 3 Avg: 3 Max: 3	Out at sea in a small raft. The sea was particularly choppy and birds were difficult to locate and identify during the survey.
Cormorant	<50m at closest and 2km (at furthest – within Old Colwyn area)	Max: 4 Min: 1 Avg: 2	Four birds were observed loafing and roosting within the intertidal area of Old Colwyn. A further 3 birds were feeding within 500m of the Phase 2b RLB and on bird was observed roosting on a floating log c.800m north-east of the Phase 2b RLB.
Coot	800m	Min: 1 Avg: 1 Max: 1	Feeding along the rock armour which fringes Rhôs-on-sea beach.
Herring gull	Within and up to 1km.	Max: 6 Min: 1 Avg: 3	One bird observed loafing within the Phase 2b RLB on the intertidal area with a further 4 individuals loafing on the harbour breakwater c.50m away. Six individuals were observed flying over the Phase 1 area and one bird was observed feeding on the Phase 1 area c.1km from the Phase 2b RLB.
Oystercatcher	100m	Min: 1 Avg: 1 Max: 1	Observed roosting on the harbour breakwater.

Source: Mott MacDonald Limited, 2021

3.2 2019-2020 survey results Colwyn Bay Waterfront Project Phase 2b

Results of the Phase 2b survey over the 2019-2020 winter are provided within Table 3.4 to Table 3.7.

Table 3.4: Survey Visit 1 – 6th December 2019 Results

Species	Distance from sea wall	Count	Field observations
Black-headed gull	<200m	Min: 1 Avg: 2 Max :6	All individuals were noted as foraging and roosting within the intertidal range.
Common gull	<250m	Min: 1 Avg: 1.5 Max: 2	Foraging and roosting within the intertidal zone, amongst other gull species (mainly common and herring species).
Common scoter	>1.0km	Min: 1 Avg: 148 Max: 500	Feeding at sea in scattered rafts of various sizes (50-500).
Cormorant	<800m	Min: 1 Avg: 12 Max: 74	The majority of birds were observed roosting on manmade structures such as walls and pylons. Fewer individuals were observed foraging and flying out to sea to feed.
Great black-backed gull	<200m	Min: 1 Avg: 1 Max: 1	Foraging within intertidal zone.
Great crested grebe	<500m	Min: 1 Avg: 1 Max: 1	All individuals were observed feeding at sea.
Great northern diver (*Gavia immer*)	600m	Min: 1 Avg: 1 Max: 1	Observed feeding at sea.
Herring gull	<250m	Min: 3 Avg: 43 Max: 200	Observed foraging and roosting within the intertidal zone.
Lesser black-backed gull	<200m	Min: 2 Avg: 3 Max: 3	Observed feeding within the intertidal area.
Oystercatcher	<150m	Min: 4 Avg: 4 Max: 4	Individuals observed feeding amongst gulls within the intertidal zone.

Source: Mott MacDonald Limited, 2021

Table 3.5: Survey Visit 2 – 9th December 2019 Results

Species	Distance from sea wall	Count	Field observations
Black-headed gull	<100m	Min: 1 Avg: 7 Max: 14	Black-headed gull were observed roosting and foraging within the intertidal range and flying over the survey area.
Common gull	<50m	Min: 2 Avg: 2 Max: 2	Both sightings of common gull were in mixed flocks of gull *sp.* foraging and roosting in the intertidal zone.
Common scoter	>1.0km	Min: 1 Avg: 118 Max: 600	moderate scattered raft observed far out at sea.
Cormorant	<100m	Min: 1 Avg: 43 Max: 81	The majority of birds were observed roosting on manmade structures such as walls and pylons, north of the survey area. Few individuals were also observed foraging and flying out to sea to feed.
Great black-backed gull	<200m	Min: 1 Avg: 1 Max: 1	Foraging within intertidal zone with other gull *sp.*

Species	Distance from sea wall	Count	Field observations
Herring gull	<100m	Min: 20 Avg: 80 Max: 200	Foraging within intertidal zone with other gull *sp.*
Lesser black-backed gull	<200m	Min: 1 Avg: 1 Max: 1	Foraging within intertidal zone with other gull *sp.*
Oystercatcher	<50m	Min: 2 Avg: 2 Max: 2	Foraging in the intertidal zone. One to two individuals were observed flying through the area.
Redshank	<50m	Min: 3 Avg: 3 Max: 3	Feeding within the intertidal zone, with oystercatcher.

Source: Mott MacDonald Limited, 2021

Table 3.6: Survey Visit 3 – 6th January 2020 Results

Species	Distance from sea wall	Count	Field observations
Black-headed gull	<100m	Min: 2 Avg: 4 Max: 19	All individuals were noted as foraging and roosting within the intertidal range and upon the rocky walls leading into the sea.
Common gull	<250m	Min: 1 Avg: 2 Max: 4	Similar to previous surveys, common gull were observed foraging and roosting within the intertidal zone, amongst other gull species (mainly black-headed and herring species).
Common scoter	>1.0km <1.0km (one small raft of three)	Min: 6 Avg: 253 Max: 600	Feeding at sea in scattered rafts of various sizes (50-600 per raft). One small raft of 3 individuals were detected approximately 500m away but did not drift any closer towards the bay.
Cormorant	<800m	Min: 1 Avg: 1.5 Max: 2	Few individuals were observed roosting on manmade structures such as walls, the breakwater and pylons within the survey extent. Other individuals were observed foraging and flying out to sea to feed.
Great black-backed gull	<200m	Min: 1 Avg: 1 Max: 1	One individual was observed foraging at sea.
Great crested grebe	<500m	Min: 1 Avg: 2 Max: 3	All individuals were observed feeding at sea.
Herring gull	<50m	Min: 2 Avg: 11 Max: 40	Observed foraging and roosting within the intertidal zone. Several individuals were also seen foraging at sea and flying over the survey extent.
Oystercatcher	<100m	Min: 1 Avg: 3 Max: 5	Similar to previous surveys, all individuals observed feeding amongst gulls and turnstone within the intertidal zone.
Redshank	<100m	Min: 2 Avg: 16 Max: 30	Three redshank were observed feeding within the intertidal zone, close to one another.

Source: Mott MacDonald Limited, 2021

Table 3.7: Survey Visit 4 – 16th January 2020 Results

Species	Distance from sea wall	Count	Field observations
Black-headed gull	<100m	Min: 1 Avg: 17 Max: 50	Recorded foraging and roosting within the intertidal zone.
Common gull	<250m	Min: 1 Avg: 1 Max: 1	Similar to previous surveys, common gull were observed foraging and roosting within the intertidal zone.
Common scoter	>1.0km	Min: 1 Avg: 177 Max: 600	Large raft of 600 commonly observed on all surveys, feeding at sea.
Cormorant	<800m	Min: 1 Avg: 1 Max: 1	All individuals were observed roosting on the manmade wall north of the site boundary.
Great black-backed gull	<200m	Min: 1 Avg: 1 Max: 1	One individual was observed foraging within the intertidal range.
Great crested grebe	<500m	Min: 1 Avg: 1 Max: 1	All individuals were observed feeding at sea.
Herring gull	<50m	Min: 13 Avg: 28 Max: 43	Observed foraging and roosting within the intertidal zone with black-headed gulls.
Oystercatcher	<100m	Min: 1 Avg: 6 Max: 15	Similar to previous surveys, all individuals observed feeding amongst gulls and turnstone within the intertidal zone and upon the breakwater area.
Redshank	<100m	Min: 1 Avg: 2 Max: 3	Two redshank were observed feeding within the intertidal zone, close to one another.

Source: Mott MacDonald Limited, 2021

3.3 2019-2020 survey results Phase 3 Old Colwyn Coastal Defence and Active Travel Scheme (including Splashpoint and 500m east)

Results of the 2019-2020 surveys at Old Colwyn have been provided in Table 3.8Table 3.11 to Table 3.11.

Table 3.8: Survey Visit 1 – 22nd November 2019 Results

Species	Distance from sea wall	Count	Field observations
Black-headed gull (*Chroicocephalus ridibundus*)	<50m	Min: 1 Avg: 1 Max: 2	Foraging on the intertidal area and rock revetment areas, with the occasional bird flying over.
Common gull (*Larus canus*)	<50m	Min: 1 Avg: 3 Max: 8	Foraging on the intertidal area amongst herring gull. The occasional bird flew over.
Common scoter	<400m (small numbers of birds) and >1.5km (main	Min: 20 Avg: 145 Max: 500	Scattered medium to large rafts of birds (50-500) were visible from the coastal footpath, up to 1.0km-3.0km out to sea. The majority of birds were observed feeding and flying to and from other, scattered rafts within the area.

Species	Distance from sea wall	Count	Field observations
	feeding zone)		Two small rafts of 13-20 birds were recorded chasing one another towards the bay within 500m of the coastline for approximately 15 minutes. Subsequently, the birds returned to the larger rafts of birds approximately 2.0-3.0km away.
Cormorant (*Phalacrocora x carbo*)	<600m	Min: 1 Avg: 4 Max: 48	The majority of cormorant were observed roosting upon the manmade structures along the bay. In addition, several individuals were noted feeding at sea close to common scoter and within 100m of the bay.
Great black-backed gull (*Larus marinus*)	<350m	Min: 1 Avg: 1 Max: 1	Several individuals were seen foraging on the intertidal zone and others were seen flying over.
Great-crested grebe (*Podiceps cristatus*)	<200m	Min: 1 Avg: 1 Max: 1	One individual was observed feeding at sea, close to the tideline.
Herring gull (*Larus argentatus*)	<500m	Min: 1 Avg: 5 Max: 64	The majority of birds were seen in flocks feeding within the intertidal area. Other individuals were seen roosting on rock revetments and flying over.
Lesser black-back gull (*Larus fuscus*)	<200m	Min: 1 Avg: 1 Max: 1	All individuals were observed flying over the survey area.
Oystercatcher (*Haematopus ostralegus*)	<200m	Min: 1 Avg: 5 Max:16	The majority of birds were seen feeding within the intertidal zone, with herring gull and roosting upon the breakwater area. Others were observed flying low through the area and close to the bay.
Turnstone (*Arenaria interpres*)	<40m	Min: 1 Avg: 12 Max: 2	Turnstone were recorded feeding and roosting amongst the rock armour at grid reference SH911788. They were not observed again.

Source: Mott MacDonald Limited, 2021

Table 3.9: Survey Visit 2 – 9th December 2019 Results

Species	Distance from sea wall	Count	Field observations
Black-headed gull	<500m	Min: 1 Avg:3 Max: 6	The majority of birds were observed foraging within the intertidal area, with several individuals flying over the area.
Common gull	<200m	Min: 1 Avg: 2 Max: 2	Three birds were observed foraging with other gull species within the intertidal zone. Three other individuals were recorded flying over.
Common scoter	<500 (small numbers of birds) >1.5km (main feeding zone).	Min: 1 Avg: 148 Max: 1000	Large rafts of birds making up approximately 1000 individuals were visible from coastline, approximately 1.5-2.0km away. A small raft of 23 individuals were observed within 0.5km of the bay, which remained in the area for approximately five minutes.

			A further 3 individual birds were also observed chasing one another within 0.5km of the bay, and these stayed in view for 10 minutes. All birds observed within 0.5km of the bay returned back to the larger groups of birds up to 1.5km away after a short period of time.
Cormorant	<800m	Min: 1 Avg: 12 Max: 74	The majority of cormorant were seen roosting on manmade structures along the coastline, with a few individuals observed feeding at sea.
Great black-backed gull	<1.1km	Min: 1 Avg: 1 Max: 1	One individual was observed feeding within the intertidal zone and another individual was recorded foraging at sea.
Herring gull	<300m	Min: 1 Avg: 44 Max: 200	Herring gull were observed in large flocks feeding and roosting within the intertidal zone and rock revetment area. Many individuals were also seen flying over the area.
Lesser black-backed gull	<100m	Min: 2 Avg: 3 Max: 3	All individuals were observed feeding within the intertidal area.
Meadow pipit (*Anthus pratensis*)	<50m	Min: 10 Avg: 10 Max: 10 (most likely under-recorded)	Meadow pipit were commonly encountered along the rock revetment and grassy areas running parallel to the coastal public footpath.
Oystercatcher	<100m	Min: 4 Avg: 4 Max: 4	All individuals were observed foraging within the intertidal area.
Shelduck (*Tadorna tadorna*)	<100	Min: 3 Avg: 3 Max: 3	Three Shelduck were observed flying through the area and travelling up to 1.0km out to sea. It is possible that the birds flew from the bay, however this could not be confirmed.

Source: Mott MacDonald Limited, 2021

Table 3.10: Survey Visit 3 – 6th January 2020 Results

Species	Distance from sea wall	Count	Field observations
Black-headed gull	<20m	Min: 1 Avg: 4 Max: 19	Observed feeding and loafing within the intertidal area.
Common gull	<200m	Min: 1 Avg: 1 Max: 1	All individuals were observed in mixed flocks of feeding and (or) loafing gulls, including herring and black-headed gull.
Common scoter	<500m (small numbers of birds) >1.5km (main feeding zone).	Min: 4 Avg: 253 Max: 600	In common with the previous surveys, large rafts of feeding common scoter congregated approximately 2.0-3.0km from the coastal footpath. Three small rafts of approximately 6-21 individuals came within 500m of the bay. Rafts remained in the area for approximately 15 minutes and subsequently, returned to the larger feeding raft at 2.0-3.0km away.
Cormorant	<400m	Min: 1 Avg: 2 Max: 1	Cormorant were predominantly observed basking on rocks, east and west of the Splashpoint and feeding upon the water within 400m of the bay, parallel of the Splashpoint area.
Great black-backed gull	<100m	Min: 1 Avg: 2 Max: 3	One great black-backed gull was observed on the rock armour fringing the bay.
Herring gull	<300m	Min: 2 Avg: 11 Max: 40	Herring gull were observed regularly, feeding and loafing throughout the survey extent either in small or large flocks. Few individuals were also seen feeding at sea.

Species	Distance from sea wall	Count	Field observations
Turnstone	<50m	Min: 30 Avg: 30 Max: 30	Turnstone were observed feeding amongst the rocks directly opposite the Splashpoint, along with a few oystercatcher.
Oystercatcher	<50m	Min: 1 Avg: 3 Max: 5	One to three individuals were observed feeding within the intertidal area at a time. Others were seen upon rocks feeding and feeding with turnstone.
Great-crested grebe	<100m	Min: 2 Avg: 2 Max: 2	Two individuals were observed feeding close to the tideline.

Source: Mott MacDonald Limited, 2021

Table 3.11: Survey Visit 4 – 16th January 2020 Results

Species	Distance from sea wall	Count	Field observations
Black-headed gull	<50m	Min: 1 Avg: 17 Max: 50	All individuals were noted as foraging and roosting within the intertidal range.
Common gull	<50m	Min: 1 Avg: 1 Max: 1	Roosting within intertidal and high tide zones.
Common scoter	>1.0km (main feeding zone) <1.0km (one raft) <800m (two small rafts)	Min: 1 Avg: 155 Max: 600	Feeding at sea in scattered rafts of various sizes (40-600 per raft). Two small rafts of 50 and 40 individuals were detected approximately 650m and 500m away, respectively at their closest points. These did not drift closer towards the bay.
Cormorant	<200m	Min: 1 Avg: 1 Max: 1	One individual observed flying over the sea
Great black-backed gull	<50m	Min: 1 Avg: 1 Max: 1	Two individuals were observed foraging at sea.
Herring gull	<50m	Min: 13 Avg: 28 Max: 43	Observed foraging and roosting within the intertidal zone.
Lesser black-backed gull	<50m	Min: 1 Avg: 1 Max: 1	Observed feeding within the intertidal area.
Oystercatcher	<50m	Min: 1 Avg: 6 Max: 15	Similar to previous surveys, all individuals observed feeding amongst gulls and turnstone within the intertidal zone and upon the breakwater area. The majority <50m away.
Turnstone	<50m	Min: 30 Avg: 30 Max: 30	60 turnstone were observed feeding within the intertidal zone and on the groin.

Source: Mott MacDonald Limited, 2021

3.4 Interpretation – Colwyn Bay Waterfront Project

Surveys were undertaken over two periods across the whole frontage; from November 2019 to January 2020 and then again from February to April 2021. Within this period some bird species would be considered to be in passage. The core wintering bird period is considered to include the months of November to February. Passage periods include September/October and March/April. During the following interpretation these have been considered separately.

3.4.1 Overwintering Period

During the overwintering period, 20 species were detected within the survey area. The majority of observations were of gull species including great black-backed, lesser black-backed, black-headed, common and herring gull which were commonly found feeding, loafing and roosting within the intertidal area during a rising tide. Herring gull were more abundant than the other gull species that were present.

Other species observed feeding, loafing or roosting within the intertidal area and upon manmade structures included moderate numbers of cormorant (<82), oystercatcher (<50) and small numbers of common redshank (<15) , (<20) turnstone and (<3) shelduck. Smaller waders such as redshank, oystercatcher and turnstone appeared to favour rock armour and the breakwater area opposite Rhôs-on-Sea beach, which may be due to the intertidal range. The intertidal rage available was considered small, thus potentially creating shorter feeding opportunities during rising and falling tides.

During high tide, the majority of sightings were of birds loafing and foraging at sea, including individual gull species alongside foraging cormorant (<50) and small numbers of great crested grebe (1-2), great northern diver (1) and small to large sized (1-1000) rafts of SPA designated species, common scoter.

Common scoter numbers ranged between raft sizes of 500-1000 birds per single observation. The majority of rafts were located beyond 1.0km at sea, close to the wind turbines. However, smaller rafts of less than 40 individuals did approach landward and were observed within 0.5km of the seawall when displaced from offshore areas by individuals chasing one another and other smaller groups following.

Displacement could also have been due to weather and/or sea vessel disturbance, however this cannot be confirmed.

Maximum peak counts of common scoter were observed during December where up to 1000 birds were identified at sea.

Other bird species found landward included meadow pipit and starling.

3.4.2 Passage Period

During the passage period, the majority of birds observed were gulls. Herring gull were seen in moderate numbers of up to 68 birds per observation, whereas common, lesser black-backed were seen in smaller groups and (or) as individuals, usually amongst herring gull feeding and loafing within the intertidal range or at sea.

Common scoter were also sighted during March, where numbers of up to 250 individuals were identified per observation which reduced to three individual birds during April. However, it is important to note that the sea was unsettled during the April survey and exact numbers count not be confirmed due to poor visibility. Lower numbers of this species would be expected at this time due them migrating back to northern breeding grounds.

During the low tide period, species such as common redshank, oystercatcher, turnstone were seen in smaller numbers feeding within the intertidal range and upon the rock amour.

Other species observed during the passage period included one coot and up to 30 starling.

3.5 Areas and Habitats of Value

3.5.1 Intertidal Area

Generally, wader numbers and species diversity were lower than typical for an intertidal area. This is likely to reflect the nature of the coast at this location and reduced density and availability of feed in sediments compared to other locations, which could also be due to the lack of or short intertidal area available during low tide periods.

Bird species, particularly redshank, turnstone, oystercatcher and cormorant appeared to favour Rhôs-on-Sea beach area and Splashpoint, where there appears to be more rock armour and intertidal range in comparison to the rest of the survey area.

3.5.2 Sea

The offshore sea area was identified as important for SPA species, particularly for large numbers of common scoter, where up to 1000 individuals were identified during one observation in December.

The relatively high numbers of this species recorded during the surveys is thought to relate to the availability of feeding opportunities within the survey area, littoral molluscs in particular.

The sea area also supports numbers of herring, black-headed, common, lesser and great black-backed gull, shelduck, great-crested grebe, cormorant and great northern diver. Most individuals appeared to be feeding or loafing at sea.

3.5.3 Rhôs-on-Sea Breakwater Area

Manmade structures, anchored vessels and the breakwater area were of value to roosting cormorant, turnstone, common redshank and oystercatcher, particularly during high tide. It is likely that this area is considered as safe to bird species due to the lack of access and remoteness of the area.

3.6 Summary

In terms of spatial variation, across the whole frontage, species richness (*n*=20) is considered moderate based on the size of the survey area, habitats available and disturbance levels experienced across the landscape as a whole.

The number and richness of bird species were consistent throughout all surveys, including between the 2019/20 winter and late winter 2021. Species recorded were also typical of the habitats located within the survey area. The most notable areas for wintering bird species within the survey area are the intertidal, breakwater and sea areas.

The offshore sea area appears to be important for SPA designated species: common scoter, where significant numbers were observed throughout the over wintering period.

The breakwater area appeared to support a greater number of roosting species, particularly during high tide. However, the numbers of birds supported by this area was not considered significant.

3.7 Validity of the Survey Data and Assessment

In line with CIEEM guidance[4] on the lifespan of ecological surveys, the survey results are considered valid for up to 18 months. Following this, the survey data should be reviewed and, if appropriate, updated to ensure any assessment and mitigation approach remains valid.

[4] CIEEM (2019). On the Lifespan of Ecological Reports and Surveys

4 Assessment of Results and Impacts

4.1 Site Importance

The surveys undertaken monthly from November 2019 to January 2020 and further surveys undertaken from February to April 2021 have recorded the presence of 20 bird species throughout the survey area.

The number of birds utilising the intertidal area during winter were not considered significant, as smaller numbers of species were present.

However, the sea (>500m from the sea wall) supported large numbers of SPA designated species this area is considered to have potential importance, for common scoter in particular.

The results of the survey do not indicate that the area is important for passage species, both in terms of species present or numbers of birds using the area, with the numbers of birds and species assemblage remaining fairly constant throughout all months of the survey.

4.1.1 Intertidal Area and Rock Revetment Areas

The works are likely to create a temporary loss of habitat through beach recharge works and habitat fragmentation for gull (herring, common, black-headed, lesser and great black-backed), duck (shelduck), waders (redshank, turnstone and oystercatcher etc.), particularly those which utilise the breakwater opposite Rhôs-on-Sea beach area.

However, due to the existing and similar habitat available outside of the Scheme area it is likely that these species will become locally and temporarily displaced from the Scheme area and will move to other areas which are of similar quality habitat during the construction phase.

4.1.2 Sea Area

The Scheme works are likely to create noise and visual disturbance to all species which utilise the sea area, particularly during high tide when species have the ability to move closer towards the seawall and may be pushed towards the seawall due to poor weather conditions and other factors.

Bird species likely to be affected by disturbance during the constructional phase include, SPA designated species common scoter and gull, diver, duck, grebe species and cormorant.

4.2 Potential Impacts

The current proposals for the Scheme involve activities which have the potential to cause the temporary disturbance as well as fragmentation of some areas of value to over wintering birds identified within the survey area – these being the intertidal area, sea and breakwater area.

Temporary impacts could arise from the construction activities including, beach recharge and barge, vessel and pipeline movements associated with the import of sand, as well as construction works on the promenade and intertidal area.

Potential impacts include:

- Disturbance;
- Temporary loss of foraging opportunities (due to smothering of benthic species);
- Water pollution; and
- Light and noise pollution.

The resulting effects may include:

- A temporary reduction in species richness and/or abundance of bird species and numbers;
- A temporary loss of local populations;
- A temporary displacement of birds from foraging sites; and
- A temporary reduction in overwinter survival.

4.3 Conclusion

Surveys have shown that the area holds an assemblage of birds on the promenade and intertidal area which is low in diversity and also abundance indicating that the habitats present are not significant to support wintering birds.

Whilst there will be some effects from construction works, these are considered to be low compared to existing background levels and for a limited period of time.

Recharge works are considered to be the element likely to cause the biggest potential effect but will be undertaken outside of the core wintering bird period and any associated impacts are likely to be temporary in nature when very low numbers of birds are expected to be present and using the intertidal area.

Due to the large numbers of common scoter recorded offshore, further consideration of impacts to these species will be required in the form of a HRA, as this species is listed as a feature of interest of the Liverpool Bay SPA.

4.4 Recommendations

A HRA will need to be undertaken to consider the potential effects of the works on the Liverpool Bay SPA.

Measures to reduce disturbance to birds should be considered. These typically include:

- Acoustic and visual screening;
- Tide cycle working i.e. working at mid-low tide only;
- Ecological watching brief to monitor effects during works and with set procedures to pause/restart and stop or reschedule works should adverse effects be observed; and
- Toolbox talks given to all workers to advise on how best to minimise disturbance.

The requirements for any mitigation will be defined by the HRA and any required for SPA species will likely have benefit for other bird species wintering or on passage through the area.

A. Colwyn Bay Waterfront Phase 1 Area Supplementary Results

Table A.1: November 2019 Survey Results – Colwyn Bay Waterfront Phase 1 area

Date	Species	Distance from sea wall	Count	Field observations
22/11/19	Black-headed gull	<50m	65	Foraging on the intertidal area and rock revetment area, with the occasional bird flying over.
22/11/19	Common gull	<50m	2	Foraging on the intertidal area amongst herring gull. The occasional bird flew over.
22/11/19	**Common scoter**	>1.5km (main feeding zone)	*c.*2000	Scattered medium to large rafts of birds (50-500) were visible from the coastal footpath, up to 1.0km-3.0km out to sea. The majority of birds were observed feeding and flying to and from other, scattered rafts within the area.
22/11/19	Cormorant	<500m	5	All birds were observed flying over.
22/11/19	Great black-backed gull	<100m	4	Two individuals were seen foraging on the intertidal with other gull species zone and others were seen flying over.
22/11/19	Great-crested grebe	<100m	1	Two individuals were observed feeding at sea, close to the tideline.
22/11/19	Herring gull	<500m	63	The majority of birds were seen in flocks feeding within the intertidal area. Other individuals were seen roosting on manmade structures along the promenade.
22/11/19	Lesser black-back gull	<200m	2	All individuals were observed feeding with other gull species.

Source: Mott MacDonald Limited

Appendix 9.6 – Bat Survey Report

MOTT MACDONALD

Colwyn Bay Waterfront Project Phase 2b

Bat Survey Report

August 2021

Mott MacDonald
Mott MacDonald House
5 Woodland Road West
Colwyn Bay LL29 7DH
United Kingdom

T +44 (0)1492 534601
mottmac.com

Environment Roads & Facilities
Conwy County Borough Council
Mochdre Council Offices

Colwyn Bay Waterfront Project Phase 2b

Bat Survey Report

August 2021

Issue and Revision Record

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Contents

Executive summary

Conwy County Borough Council (CCBC) has appointed Mott MacDonald Limited to provide ecological advice in respect of the proposed Colwyn Bay Waterfront Phase 2b Scheme. The proposed works include upgrades to the promenade, coastal defence improvements and beach recharge, hereafter referred to as the Scheme within this report.

Mott MacDonald Limited undertook a Preliminary Ecological Appraisal (PEA) of the wider Colwyn Bay area which included the Scheme site and its surroundings, which identified potential for roosting bats within the buildings present on site. As such, further bat surveys were recommended.

The objectives of the bat survey and of this report were to: determine the bat species currently present within the site, identify any roosts and assess if these roosts would be affected by the proposed works, identify foraging areas and commuting routes within the site, and to develop appropriate site-specific recommendations.

A data search from the local biodiversity records centre indicates records of four bat species recorded within 2.0km of the survey area. Six internationally designated sites designated for bats, or known to support bats, were identified within 10km of the Scheme.

An assessment of buildings to be affected by the proposed works was carried out during March and June 2021. Two buildings were identified as having low suitability to support roosting bats, comprising a seating shelter and kiosk. In line with best practice methodology, a single bat emergence survey was undertaken on the 2nd June 2021. No bats were recorded emerging from or exhibiting roosting behaviour, at either of these buildings.

There would be no direct impacts to the trees lining Cayley Promenade and no works that would constitute significant disturbance in their vicinity. Therefore trees were not considered further within this assessment.

Foraging activity by three bat species - noctule, soprano pipistrelle and common pipistrelle, were noted in the vicinity of both survey locations however, these were predominantly utilising the vegetation south of West Promenade to forage. Additionally, there is anecdotal evidence of a roost present in the Mount Stewart Hotel, provided by a member of the public during the survey.

Although no emergences were reported, due to the presence of foraging and commuting bats within the vicinity, recommendations include a sensitive lighting design for the Scheme. During night-time construction works lighting would be minimised with any lighting to be of a colour temperature of <2700K, directional onto the area of working and with no upward illumination. In addition, no illumination of vegetation or confirmed bat flight-lines is advised.

Lighting design should take into consideration, as far as practicable, the mitigation methods outlined in the ILP Guidance[1] such as dark buffers, illuminance limits, zonation, appropriate luminaire specifications and screening.

Noise levels should be kept to a minimum throughout the works areas by turning plant and machinery off when not in use (no idling), particularly during the night-time to prevent disturbance in the local area.

Enhancement opportunities include the provision of dark commuting/foraging corridors via non-illuminated native hedgerow planting which link to the surrounding green infrastructure.

[1] Institution of Lighting Professionals and Bat Conservation Trust, 2018. Bats and artificial lighting in the UK Bats and the Built Environment series – Guidance Note 08/18

Additionally, the proposed application of green hay to Cayley Embankment and planting of native shrubs will improve the structural diversity benefiting bat species within the local area.

1 Introduction

1.1 Background

Mott MacDonald Limited has been commissioned by Conwy County Borough Council (CCBC) to advise on Phase 2b of the Colwyn Bay Waterfront scheme, a coastal defence scheme located in Colwyn Bay, North Wales, hereafter referred to as 'the Scheme' (Figure 1.1).

Figure 1.1: Site Location

Source: DigitalGlobe, Microsoft, Earthstar Geographics | Esri UK, Esri, HERE, Garmin, METI/NASA, USGS

The Victorian built coastal defences around Colwyn Bay from Rhôs-on-Sea in the west to Old Colwyn in the east have suffered from undermining, corrosion, partial collapses and degradation with frequent overtopping events occurring at spring tides.

Phase 1abc and 2a of the Colwyn Bay Waterfront Project have already been completed which included the construction of a 150m groyne and Porth Eirias, beach recharge and promenade improvements in the central Colwyn Bay area. Detailed design for the Old Colwyn Coastal Defence and Active Travel Scheme has also been completed with construction underway from April 2022.

Detailed design for Phase 2b of the Colwyn Bay Waterfront Project is currently being undertaken, to provide a permanent upgrade of the coastal defences to protect the western area of the bay concurrently with improvements to the promenade to facilitate active travel and regeneration.

These proposed schemes are illustrated in Figure 1.2 below, namely:

- 'Colwyn Bay Waterfront Project Phase 1abc';
- 'Colwyn Bay Waterfront Project Phase 2b' to the west; and
- 'Old Colwyn Coastal Defence and Active Travel Scheme' to the east.

A Preliminary Ecological Appraisal (PEA) was undertaken in respect of the entire Colwyn Bay Waterfront Scheme area in December and January 2019/20. Further site visits were undertaken

in March and June 2021 of the Phase 2b area. This report has been produced in respect of the Phase 2b area only.

Figure 1.2: Scheme Location Within Colwyn Bay

Source: 'ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community'. Note The completed Colwyn Bay Waterfront Phase 2a Scheme area straddles the Phase 1 and Phase 2 areas.

1.2 Site Description

The Site comprises the existing seawall and adjacent sand and shingle of the Colwyn Bay to Rhôs-on-Sea beach along with the adjacent pedestrian promenade, the Promenade/West Promenade/Rhôs Promenade (highway) and in the central area the grassed slope of Cayley Embankment, with Cayley Promenade highway to the west (shown in Figure 1.3). The approximate national grid references for the western and eastern Scheme boundaries are SH84248052 and SH85717903 respectively.

Figure 1.3: Site Red Line Boundary

Source: Mott MacDonald Limited, Adapted from Red Line Boundary Drawing 100374-MMD-00-XX-DR-Z-0001

1.3 Proposed Works

The proposed scope of work is anticipated to comprise a combination of coastal defence and promenade improvements.

1.3.1 Coastal Works

The coastal defence works would be anticipated to include:

- From Rydal Boat store to the southern boundary of Rhôs-on-Sea Harbour:
  - Minor repairs (e.g. re-pointing) to the existing sea wall;
  - Removal of remaining areas of existing rock revetment located against the sea wall and existing groynes in recharge areas for re-use in the modification of the terminal groyne at Rhôs Harbour; and
  - Modification of outfalls as appropriate to enable them to continue operating with the raised beach levels.
- From Horizon Shine to the southern boundary of Rhôs-on-Sea Harbour:
  - Beach recharge involving the importation and placement of approximately 1,000,000t (~666,000m^3) of dredged sand material between the Rhôs-on-Sea terminal groyne to the west and the Horizon Shine Kiosk to the east to bring levels up to match the design profile of the Phase 1 works (approximately 5mAOD).

- To the east of the Horizon Shine Kiosk:
  - The Scheme would also appropriately include for any 'topping up' of beach levels and the management/recycling of the existing beach that may be required between the Horizon Shine Kiosk and the Colwyn Bay Pier.

Note: An additional temporary area would be required for pipeline construction associated with the beach recharge via barge, anticipated to be Pensarn Beach.

1.3.2 Promenade Works

The promenade improvement works are currently anticipated to comprise upgrading the promenade to enhance the experience of visiting the promenade to the general public. The design is on-going, however it is currently anticipated to include:

- The inclusion of a 2.2m wide pedestrian-only zone;
- 4m wide shared surface with health markers at 50m intervals;
- Designated picnic / seating areas;
- Activity zones;
- "Rhôs" feature letters and artwork;
- Pedestrian links across the highway & promenade;
- Traffic re-routing;
- Intermediate links across promenade & shared surface;
- New surface finishes;
- Landscaping (including appropriate planting / soft landscaping);
- Streetlighting; and
- Street furniture / features.

1.3.3 Management and Maintenance

The Scheme also 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 ancillary assets;
- Management of wind-blown sand;
- Maintenance of landscaping; and
- Beach management/reprofiling and small-scale re-nourishment as necessary.

1.3.4 Proposed Works Programme

Due to funding constraints, construction is anticipated to commence by March 2022 at the latest and last for approximately 14 months. Given the scale of the Scheme it is possible that the work would be completed in stages.

1.4 Scope of the Report

The objectives of this report are to:

- Determine presence of any bat species within the site;
- Identify any roosts within the development footprint and assess if the roost will be impacted by the proposed works;

- Record any foraging and commuting flight lines around the site; and
- Develop appropriate site-specific recommendations.

2 Legislation and Ecology

2.1 Legislation

All UK bat species and their roosts are fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017 (as amended). It is an offence to:

- Deliberately capture, injure or kill a bat;
- Intentionally or recklessly disturb a bat in its roost or deliberately disturb a group of bats;
- Damage or destroy any structure or place used for shelter or protection by a bat (even if bats are not present in the roost);
- Intentionally or recklessly obstruct access to a structure or place which it uses for that purpose; or,
- Possess or advertise/sell/exchange a bat (dead or alive) or any part of a bat.

If bats are present, to undertake an activity which is prohibited under wildlife legislation, a protected species development licence may be applied for from the statutory regulator; in this instance, Natural Resources Wales (NRW). By holding a development licence, the works can be conducted in accordance with an agreed method statement and as such an offence will not be committed provided the licence conditions are followed.

2.2 Status of Bat Species at the Local Level

A Nature Recovery Action Plan is currently being produced through the Bionet NE Wales Regional Local Partnership. In the meantime, Section 7 Priority Species and Habitats under the Environment (Wales) Act 2016 are considered, as detailed below:

- Barbastelle bat (*Barbastella barbastellus*)
- Bechstein's bat (*Myotis bechsteinii*)
- Greater horseshoes bat (*Rhinolophus ferrumequinum*);
- Lesser horseshoe bat (*Rhinolophus hipposideros*);
- Common pipistrelle (*Pipistrellus pipistrellus*);
- Soprano pipistrelle (*Pipistrellus pygmaeus*);
- Noctule (*Nyctalus noctula*); and,
- Brown long-eared bat (*Plecotus auritus*).

2.3 Current Factors Causing Loss or Decline at the National Level

British bats are insectivorous, occupying many habitat types. They require warm summer breeding roosts and cool, secure hibernation sites with stable environmental conditions. The main factors currently causing loss or decline, in general across the UK include:

- Habitat loss:
  - Decreasing areas of deciduous woodland, hedgerows, wetlands and grasslands reduce the availability of feeding and roosting sites. Loss and drainage of wetlands and inappropriate riparian management leads to loss of feeding and roosting areas. Undeveloped land which does not meet the standards for designation as a Site of Special Scientific Interest (SSSI) or Local Site, likely forms an important habitat for foraging bats in the local area;

- Habitat fragmentation:
  - The presence of linear features and wildlife corridors such as hedgerows and former railway lines between habitats can reduce the impact of fragmentation;
- Disturbance:
  - In the summer, this may lead to the abandonment of young;
  - In the winter, this may arouse hibernating bats and force them to use up essential food reserves too quickly, with fatal consequences;
- Tree felling and arboriculture works to dead/hollow trees:
  - All bat species, and particularly noctules, will use hollow trees for both summer and winter roosting;
- Lack of awareness:
  - There is a tendency for the needs of bats to be under-emphasised during the planning process;
- Development:
  - The loss of rear gardens to small scale housing developments results in habitat loss and reduces the structural diversity of foraging habitats for bats. Development of brownfield land is likely to lead to further habitat loss for bats;
- Refurbishment and demolition of man-made structures and buildings:
  - Roost sites in cellars, roof spaces and under eaves in buildings are lost through building maintenance, renovation and the installation of cavity wall insulation. It is now thought that bats may use cavity walls as hibernation roost sites. Bats have very specific roost requirements therefore it cannot be assumed that they will relocate to another apparently suitable site if a roost site is destroyed;
- Remedial timber treatment:
  - These can be poisonous to bats. Because of their communal nature, entire roosts may be lost due to insensitive timber treatment exercises. Lindane, a chemical that was widely used in the past, has been implicated in the eradication of entire bat colonies. Treatments carried out during the 1980s are still toxic today; and
- Changes to external lighting:
  - May pose a threat to existing and potential roosts through entrapment of bats within existing roosts due to lighting changes. Additionally, could result in bats deserting the roost or delay bats from emerging, thus reducing the available foraging time.

3 Methodology

3.1 Desk Study

A desk study was undertaken in line with current CIEEM guidelines for Preliminary Ecological Appraisals[2] to determine the presence of any nature conservation sites designated for bats or records of bats within 10.0km of the site.

Biological records within 2.0km of the site were obtained from the North Wales Environmental Information Service, Cofnod[3]. The data was refined to the last 20 years.

The following sources were utilised for the desk study:

- Multi Agency Geographical Information for the Countryside (MAGIC) website (http://www.natureonthemap.naturalengland.org.uk/MagicMap);
- Natural Resources Wales (NRW);
  - Lle Geoportal (Lle - Home (gov.wales))
  - Protected Areas of Land and Sea (Natural Resources Wales / Find protected areas of land and sea)
- Joint Nature Conservation Committee (JNCC) (http://jncc.defra.gov.uk/); and
- Environment (Wales) Act 2016, Section 7 Priority Species (Wales Biodiversity Partnership - Environment (Wales) Act (biodiversitywales.org.uk)).

3.2 Bat Inspection Surveys

3.2.1 Buildings

Fields surveys undertaken in March and June 2021 identified potential of buildings on site to support bats. The buildings were inspected externally for features that could support roosting bats and/or signs of bat presence (such as droppings, staining, feeding remains, scratch marks or presence of bats).

Each building was classified as having low, moderate or high potential for roosting bats based on the Bat Conservation Trust Good Practice Guidelines[4], as per Table 3.1 below.

Table 3.1: Guidelines for Assessing the Potential Suitability of Buildings for Bats

Suitability	Description of Roosting Habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.
Low	A structure with one or more potential roost features (PRF) that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and / or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).
Moderate	A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status.

[2] CIEEM, 2017 Guidelines for Preliminary Ecological Appraisal, Second Edition [Online] Available at: Guidelines for Preliminary Ecological Appraisal (GPEA) | CIEEM

[3] Cofnod (2021). Colwyn Bay P2b Biodiversity Information Search (Ref: E08844);

[4] Collins, Bat Surveys for Professional Ecologists: Good Practise Guidelines (3rd Edition) [Online] Available at: Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd edition - Guidance for professionals - Bat Conservation Trust

Suitability	Description of Roosting Habitats
High	A structure with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.
Confirmed Roost	Positive signs of bats are recorded within the structure (internally or externally), such as individual bats or bat droppings.

Source: Modified from Collins (2016)

3.2.2 Trees

There would be no direct impacts to the trees lining Cayley Promenade and no works that would constitute significant disturbance in their vicinity. Based on the current surrounding ambient levels of disturbance, no dedicated bat roosting assessment was undertaken.

3.3 Emergence/Re-entry Surveys (Buildings)

Buildings assessed as having suitability to support roosting bats and considered likely to be affected by the current scope of works were subject to further emergence / re-entry surveys. All surveys were undertaken in accordance with the best practice guidance set out within the Bat Conservation Trust 'Bat Surveys Good Practice Guidelines'[4] and under suitable weather conditions i.e. temperature >10°C, no strong wind and dry.

Elekon Batlogger M detectors were used to record bat activity and converted to zero crossing format for analysis using AnalookW.exe Version 20.21.5.8 computer software to enable speed and efficiency. Elekon Batlogger M are full spectrum ultrasonic recorders with extreme sensitivity enabling detection of those species which can be under recorded in the field such as brown long-eared bats.

3.4 Foraging Habitat

An assessment was made to determine the value of the habitat types within and surrounding the site for bat foraging potential, including connectivity to other suitable habitat within the wider area.

3.5 Limitations

Biological records obtained from third parties do not represent a full and complete species list for the area. Not all areas within the biological records search will have been surveyed so lack of records do not represent a lack of species present. They are mostly given by individuals on an *ad-hoc* basis, often meaning that there are areas of deficiency in the data.

Transforming recorded bat data into zero crossing may result in some information within the bat calls being lost. However, as surveys included a visual count to identify presence / absence of bats, and all calls were for species easily identifiable by call, it is considered that the survey work sufficiently informs an assessment of roost presence at the site.

It is difficult to confidently relate calls registered to numbers of bats present, even if more than one bat pass is detected simultaneously. The number of bat passes does not therefore provide any indication of bat abundance; it is intended to only indicate the level of activity at a moment in time.

Weather for the majority of the survey (undertaken from 09.20pm to 11pm) was dry although conditions were considered sub-optimal, with the survey following a long period of rain (from 5pm to 8pm) and further rain starting at 10.52pm. However, sub-optimal weather was not considered a survey constraint due to the early bat activity recorded at sunset. The survey was terminated four minutes early as a result of the heavy rain, but the survey length was

considered sufficient to provide information regarding emergence of species anticipated to be utilising the buildings, which have been recorded within the surrounding area.

4 Results

4.1 Desk Study

4.1.1 Designated Sites

Statutory designated sites within 10.0km of the Site have been presented below.

Two Sites of Special Scientific Interest (SSSIs) designated for bat species were identified within 10.0km of the Site:

- **Llanddulas Limestone and Gwyrch Castle Wood SSSI**: Designated for its winter roost of lesser horseshoe bat , supporting Clwyd's fourth largest hibernaculum of the species. Also, a hibernaculum for small numbers of four other species, Daubenton's bat (*Myotis daubentonii),* Natterer's bat (*M. nattereri)*, brown long-eared bat and common pipistrelle. located 5.45km south-east of the Site; and
- **Coed Y Gopa SSSI**: Designated for its species interest, a winter roost of lesser horseshoe bat, 8.25km east south-east of the site.

A further four SSSIs and a Special Area of Conservation (SAC) known to support bat species were identified within 10.0km:

- **Creuddyn SSSI**: Known to support small numbers of hibernating lesser horseshoe bat in the several caves and mine shafts, 1.9km west of the Site;
- **Creigiau Rhiwledyn/ Little Ormes Head SSSI**: The headland caves have historically supported hibernating populations of lesser horseshoe bat*,* 3.15km north-west of the Site;
- **Creigiau Rhiwledyn/ Little Ormes Head SAC:** As above under the SSSI; and
- **Pen y Gogarth/Great Ormes Head SSSI**: The headland caves support hibernating populations of lesser horseshoe bat.

4.1.2 Bat Species Records

Records of bat species within 2.0km of the Site and from the last 20 years indicate the presence of four species:

- Lesser horseshoe;
- Brown long-eared*;*
- Noctule; and
- Soprano pipistrelle.

No records of any bats or roosts have been returned at the Site over the last 30 years. The closest record of an unknown bat species located at the eastern end by the Dingle, 265m away and a common pipistrelle was recorded in the same location at 291m east of the site and another was recorded at the north-west end of the Site, 300m east on Rhôs Road. A comprehensive list of all bat roosts recorded within 2.0km of the Site within the last 20 years are shown below in Table 4.1.

A cluster of records was returned north of the police headquarters, in the location of a pond, trees, vegetation and a large, derelict building approximately 435m south-east of the Site. These comprised the following:

- Six common pipistrelle;
- Two soprano pipistrelle;

- One noctule; and
- Unknown sp. foraging.

Table 4.1: Bat roosts recorded over the last 20 years within 2.0km of the Site

Species	Record	Distance
Pipistrelle sp.	Droppings	265m south
Common pipistrelle	Emergence from property - 2 individuals	291m south
Auritus plecotus	Droppings	435m south-east
Unknown	Droppings in 1994	584m south
Unknown	Droppings	818m south
Unknown	Droppings	823m south
Lesser horseshoe bat	3 individuals	960m south
Lesser horseshoe bat	3 individuals roosting in building	1.1km
Unknown	Recording	1.13km west
Unknown	Roosts at two locations	1.24km south and south-west
Common pipistrelle	Roost	1.3km west
Unknown	150 + individuals roosting in building	1.38km south-east
Common pipistrelle	Emergence from loft space – 6 individuals	1.4km south-east
Pipistrelle sp.	Droppings within a cluster of houses	1.9km south-east

Source: Cofnod, 2021

4.2 Field Survey

4.2.1 Survey Details

Details of the surveys are presented in Table 4.2 below.

Table 4.2: Emergence / Re-entry Survey Details

Date	Sunset	Start/ End Time	Start / End Temperature (°C)	Precipitation	Wind (Beaufort Scale)	Cloud Cover (%)	Buildings Surveyed
2nd June 2021	9.34pm	9.20pm – 11.00pm	19/ 17	Survey followed long period of rain 5pm – 8pm. Dry to start and rain at 10.52pm	5	100	• B3 • B7

Source: Mott MacDonald Limited, 2021

4.2.2 Building Inspections

Eight buildings were assessed within the Site, shown in Figure 4.1Figure 4.2 below.

Figure 4.1: Location of buildings in Western half of the Scheme

Source: Maxar, Microsoft | Esri Community Maps Contributors, Esri UK, Esri, HERE, Garmin, INCREMENT P, METI/NASA, USGS

Figure 4.2: Location of buildings in eastern half of the Scheme

Source: Maxar, Microsoft | Esri Community Maps Contributors, Esri UK, Esri, HERE, Garmin, INCREMENT P, METI/NASA, USGS

Table 4.3: Bat Assessment and Inspection Results for Buildings

Building Number	Description	Assessment of Roost Suitability and Evidence of Bats
B1	A seating shelter located in the western most end of the survey area. Mortar and stonework construction with a flat roof comprising felt and wood. East facing cavity was noted (100mm x 20mm) however, does not lead to a void to support crevice dwelling species.	**Negligible suitability. No evidence.**
B2	A seating shelter and energy networks building. Concrete construction with felt roofing. Three south-facing gaps were noted however, all were covered by cobwebs therefore no signs of recent use and illuminated by adjacent streetlight during night-time hours	**Negligible suitability. No evidence.**
B3	The Cayley Kiosk, asbestos and plastic/ wood roof construction. Small gaps were noted to access the asbestos tile void on the north-east side. No droppings beneath. A further large cavity was noted leading into the roof void where the asbestos tile had dropped on the south-west corner.	**Low suitability. No evidence.**
B4	A seating shelter of mortar and stonework construction with a flat roof fibreglass and wood. A large cavity was located within the plywood false roof surrounding a vertical drainpipe. The roof was leaking, and water was running out through the cavity, following period of heavy rain.	**Negligible suitability. No evidence**
B5	A seating shelter comprising mortar and stonework with a flat roof of fibreglass and wood. A cavity was noted within the soffit box on the south-east corner however, cobwebs were covering the entrance and illuminated by adjacent streetlight during night-time hours. The roof was observed leaking, following period of heavy rain. Tight construction elsewhere.	**Negligible suitability. No evidence.**
B6	The Coffee Pot Kiosk. A small gap was located on the south-west corner in the soffit box however, cobwebs present indicating no sign of recent use and illuminated by adjacent streetlight during night-time hours.	**Negligible suitability. No evidence.**
B7	Seating shelter located in the eastern end of the Scheme area comprising mortar and stonework with a flat roof of fibreglass and wood. A feral pigeon was noted to be nesting in the north-east end, on top of one of the uprights. Gaps leading into the roof space were located along the north and south of the shelter between the structural metal beams. An additional gap was noted around the vertical drainage pipe.	**Low suitability. No evidence.**
B8	Horizon Shine Kiosk. A new kiosk with a flat roof comprising tin. Not going to be impacted as part of construction works however, is located within the RLB. Tight structure with no evidence of bats.	**Negligible suitability. No evidence.**

Source: Mott MacDonald Limited, 2021

Further survey work was recommended in respect of B3 (The Cayley Kiosk) and B7 (seating shelter) in the form of a single emergence survey conducted on both.

4.2.3 Trees

There would be no direct impacts to the trees lining Cayley Promenade and no works that would constitute significant disturbance in their vicinity. No trees are to be affected by the proposals therefore no targeted surveys were undertaken.

4.3 Emergence/ Re-entry Surveys

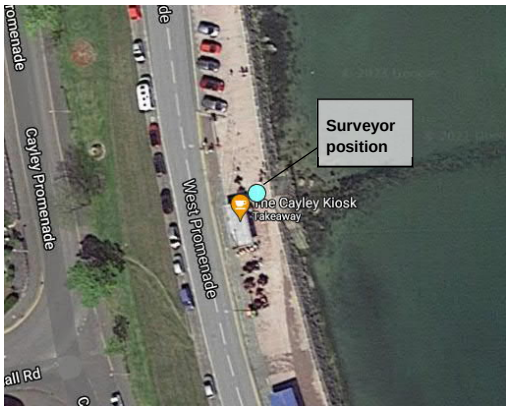
During the emergence survey on the 2nd June 2021, no bats were recorded emerging from the buildings surveyed. Surveyor locations are shown on Figure 4.3 and Figure 4.4 with results of the survey summarised in Table 4.4.

Table 4.4: Emergence Survey Results

Date	Survey Type	Building	Emergence Results	General Observations
02/06/2021	Emergence	B3 – Cayley Kiosk	None	Common pipistrelle and noctule noted predominantly foraging.
02/06/2021	Emergence	B7 – Shelter	None	Predominantly foraging noctule with a couple of common pipistrelle noted.

Source: Mott MacDonald Limited, 2021

Figure 4.3: Surveyor Position – B3, Cayley Kiosk



Source: Maxar, Microsoft | Esri Community Maps Contributors, Esri UK, Esri, HERE, Garmin, INCREMENT P, METI/NASA, USGS

Figure 4.4: Surveyor Position – B7, Shelter

Source: Maxar, Microsoft | Esri Community Maps Contributors, Esri UK, Esri, HERE, Garmin, INCREMENT P, METI/NASA, USGS

4.4 Bat Activity

Foraging and commuting bat activity was recorded during the survey within the vicinity of both buildings but not directly associated. Two species were identified - common pipistrelle and noctule.

Around B3 (Cayley kiosk), the first pass was a noctule at 09.34pm (sunset) which was distant and heard but not seen. The last pass was a common pipistrelle at 10.52pm, which was also not visible. A total of 48 passes were recorded comprising the following three species:

- Noctule;
- Common pipistrelle; and
- Soprano pipistrelle.

The majority of the passes recorded were attributable to foraging noctule with foraging and commuting common pipistrelle. A member of the public approached during the survey and provided anecdotal evidence that a roost is located in a hotel, The Mount Stewart, 45m to the west of the kiosk. However, this data is not reflected in the biological species records.

At B7 the first pass was noted at 09.36pm (two minutes after sunset) by a soprano pipistrelle, with the last pass recorded at 11.00pm by common pipistrelle. A total of 32 passes comprising the three species outlined above. These predominantly comprised noctule foraging above West Promenade and the vegetation surrounding the Rydal Penrhos Boat Store. One commuting noctule was noted flying south east down west promenade at 10.31pm.

The entire waterfront was noted to have a combination of predominantly light emitting diode (LED) and metal halide streetlights lining the roadside of the pedestrian promenade. As a result, the south face of all buildings on the pedestrian promenade lining West Promenade and Rotary Way experience nightly light spill, thereby reducing the suitability of roosting features identified during the building assessment, which are present at this orientation.

5 Interpretations and Recommendations

5.1 Interpretation

5.1.1 Roosting Bats

No bats were recorded emerging from either B3 or B7 during the surveys undertaken. Although a negative result was obtained from a single emergence survey, these buildings were categorised as low suitability for bats and are unlikely to be used on a regular basis. These buildings have the potential to support transitional roosts for single or small numbers of bats or used as a night and/or feeding roost (in particular the exposed metal beams of B7), however no evidence of feeding remains was identified during the building assessment, but future use cannot be precluded. These buildings are also considered to be unsuitable for hibernating bats.

All other buildings within the site were assessed as having negligible suitability for roosting bats due to factors ranging from no physical signs of recent use such as cobwebs covering potential access points, leaking roofs, illumination of features by streetlights adjacent and/or tight structure with no structural deformities which could be utilised by crevice dwelling species such as pipistrelles. No features on these structures were considered suitable as night perches/feeding roosts and is supported by a lack of feeding remains observed during the building assessment.

All buildings along the promenade are exposed to the elements and constructed from materials which would experience significant fluctuations in environmental conditions thereby limiting suitability as a hibernation roost.

No trees are to be directly affected by the proposed works and no works that would constitute significant disturbance are proposed in their vicinity.

5.1.2 Bat Activity

Foraging and commuting activity was recorded during the survey attributable to noctule, soprano pipistrelle and common pipistrelle however, no activity was associated with either of the buildings surveyed. Open habitat and existing lighting along the length of the pedestrian promenade is considered likely to deter light adverse species such as lesser horseshoe bats, which were recorded within 2.0km of the Site.

5.2 Assessment and Recommendations

No bat roosts have been recorded within the site and no trees are to be affected by the proposed works. However, given the presence of foraging and commuting bats within the Site and immediate surrounding area and the potential for transitional/occasional roosts to be present, recommendations have been outlined below[5].

5.2.1 Demolition of Buildings

Buildings identified of low suitability to support roosting bats should undergo a ‘soft strip’ involving sensitive removal of the roof which exposes the roof void and any potential roosting bats present. If any bats are identified during the removal, then the project ecologist should be notified immediately and all works within the area ceased. Timing of works should avoid the winter period between November and February inclusive.

[5] CIEEM, June 2021. Bat Mitigation Guidelines - A guide to impact assessment, mitigation and compensation for developments affecting bats [Online] Available at: Bat Mitigation Guidance | CIEEM

5.2.2 Lighting Mitigation

When designing the lighting as part of the Scheme, the following should be considered in line with ILP and BCT guidance[6]:

- Dark buffers, illuminance limits and zonation;
- Appropriate luminaire specifications;
- Sensitive site configuration;
- Internal lighting mitigation options;
- Screening;
- Glazing treatments;
- Creation of alternative valuable bat habitat on site; and
- Dimming and part-night lighting.

Beach recharge construction works are anticipated to be a continuous 24hr operation for between 8-20 weeks duration. Construction undertaken within night-time hours should minimise lighting[6], where possible, with any lighting to be of a colour temperature of <2700K, directional onto the area of working and with no upward illumination. In addition, no illumination of vegetation is advised, to prevent adverse impacts upon nocturnal wildlife such a bats and invertebrates.

5.2.3 Noise Mitigation

Additionally, noise levels should be kept to a minimum throughout the works areas by turning plant and machinery off when not in use, particularly during the night-time hour so as to minimise disturbance upon bats in the local area.

The results of this survey work are considered to be valid for up to 12-18 months, which is in line with guidance on the lifespan of surveys[7] (CIEEM 2019). Following this, survey work may require updating should any new works be proposed, or a significant delay to programme will occur.

5.2.4 Further Recommendations

Enhancements could be implemented during landscape design to include the provision of dark commuting and foraging corridors via non-illuminated native hedgerow planting which link to the surrounding green infrastructure. These continuous linear features would benefit bat species within the local area.

Additionally, enhancements to the Cayley Embankment are proposed to include green hay application resulting in improvements to the structural diversity and planting of native shrubs, which would provide further foraging opportunities for bats.

[6] Institution of Lighting Professionals and Bat Conservation Trust, 2018. Bats and artificial lighting in the UK Bats and the Built Environment series – Guidance Note 08/18

[7] CIEEM (2019) On the lifespan of ecological reports and surveys

Appendices

A. Building Photos

Figure A.1: Seating shelter (B1)

Source: Mott MacDonald Limited, 2021

Figure A.2: Seating shelter and energy networks building (B2)

Source: Mott MacDonald Limited, 2021

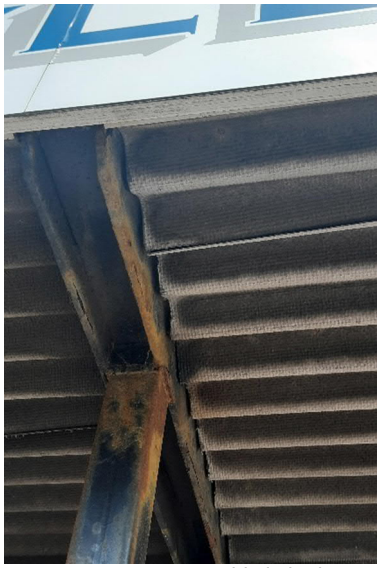
Figure A.3: South facing gap in roof (B2)

Source: Mott MacDonald Limited, 2021

Figure A.4: The Cayley Kiosk (B3)

Source: Mott MacDonald Limited, 2021

Figure A.5: Gap on north-east side (B3)



Source: Mott MacDonald Limited, 2021

Figure A.6: Dropped roof void on south-west side (B3)

Source: Mott MacDonald Limited, 2021

Figure A.7: Seating shelter (B4)

Source: Mott MacDonald Limited, 2021

Figure A.8: Cavity surrounding drain pipe (B4)

Source: Mott MacDonald Limited, 2021

Figure A.9: Seating shelter (B5)

Source: Mott MacDonald Limited, 2021

Figure A.10: Cavity within soffit box on south-east corner (B5) Note: during the period of rain, water was pouring out of this cavity

Source: Mott MacDonald Limited, 2021

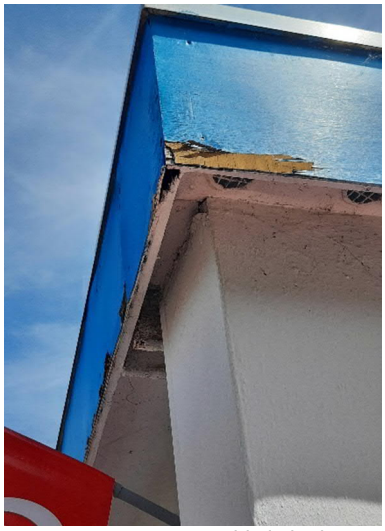
Figure A.11: Cavity around drain pipe with leaky roof (B5)

Source: Mott MacDonald Limited, 2021

Figure A.12: The Coffee Pot Kiosk (B6)

Source: Mott MacDonald Limited, 2021

Figure A.13: Small gap in south-west corner (B6)



Source: Mott MacDonald Limited, 2021

Figure A.14: Seating shelter (B7)

Source: Mott MacDonald Limited, 2021

Figure A.15: Gap in plywood and nesting feral pigeon (B7)

Source: Mott MacDonald Limited, 2021

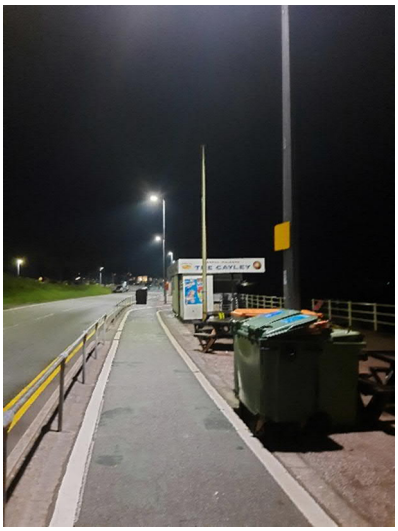
Figure A.16: Gaps between structural metal beams on north and south side (B7)

Source: Mott MacDonald Limited, 2021

Figure A.17: Horizon Shine Kiosk (B8)

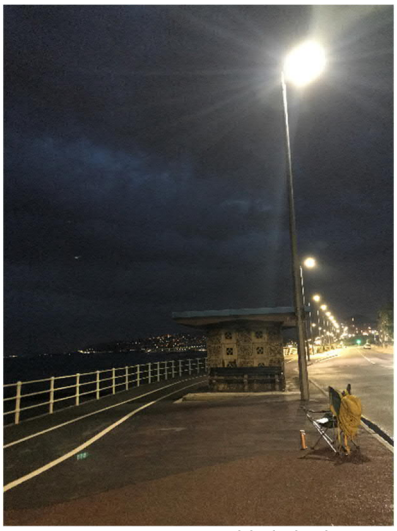
Source: Mott MacDonald Limited, 2021

Figure A.18: Lighting on West promenade (B3)



Source: Mott MacDonald Limited, 2021

Figure A.19: Lighting of promenade and West promenade (B7)



Source: Mott MacDonald Limited, 2021

Appendix 9.7 – Cayley Embankment Technical Note

MOTT MACDONALD

Technical Note

Project:	Colwyn Bay Waterfront Project Phase 2b		
Our reference:	100374-MMD-00-XX-RP-N-0009	**Your reference:**	N/A
Prepared by:	J Styles	**Date:**	16 August 2021
Approved by:	N Haines	**Checked by:**	N Shelton
Subject:	Cayley Embankment Grassland Ecological Enhancement		

1. Project history and background

1.1 Overview

Mott MacDonald Limited has been commissioned by Conwy County Borough Council (CCBC) to provide ecological advice to inform the Colwyn Bay Waterfront project Phase 2b scheme (the 'Scheme').

This technical note details the findings of walkover survey of the Cayley Embankment to inform an enhancement strategy that is also contained within this document. The survey was conducted to update the findings of the 2020 Preliminary Ecological Appraisal Report (PEAR)[1] when this embankment was regularly mown and follows a period of development where the area has been left unmown for longer periods of time (associated with the Covid-19 pandemic).

1.2 Site Description

Cayley Embankment is located between the Rhôs-on-Sea and Colwyn Bay waterfront areas, occupying the area between Cayley Promenade and West Promenade highways. It is immediately surrounded primarily by developed land with occasional amenity and other green spaces nearby, central grid reference: SH 84286 79954. The embankment location is shown within Figure 1 below.

The embankment is separated into two distinct portions, including a narrow, flat area that is regularly mown for amenity use, and a wide strip of sea-facing grassland sloping to the east.

[1] Mott MacDonald 2020, Colwyn Bay Preliminary Ecological Appraisal Report.

Figure 1: Site Location Plan

Source: ESRI

1.3 Proposed Works

It is proposed to increase the biodiversity value of Cayley Embankment in order to act as an enhancement measure for promenade improvement and coastal defence works. The area currently exists as impoverished permanent grassland and landscaped areas to the west of the seafront area.

This will be achieved using a number of best-practice techniques, namely including favourable verge management and conservation translocations aligned with International Union for Conservation of Nature (IUCN)[2] standards.

1.4 Purpose of Technical Note

This technical note contains results of the survey visit undertaken to update the condition and character of the grassland, which has then been used to inform proposed enhancement measures detailed below. This survey visit also acted to review the assessment and classification of the grassland habitat provided by the Preliminary Ecological Appraisal Report (PEAR) for this area.

[2] IUCN online: International Union for Conservation of Nature - IUCN, accessed 21/06/21

2. Survey methods

2.1 Preliminary Ecological Appraisal

During late 2019 to early 2020, all habitats across Cayley Embankment were characterised and mapped in compliance with the 'Handbook for Phase 1 Habitat Survey: a technique for environmental audit' produced by the Joint Nature Conservation Committee (JNCC) in 2010. Dominant plant species were noted, as were any protected, uncommon, or invasive plants listed within Schedule 9 (Part II) of the Wildlife and Countryside Act (WCA) 1981 (as amended). The assessment criteria for said categorisation used were based on current published guidance.

Although it is acknowledge that the survey was completed in a suboptimal period for the identification of some plants, it was completed by competent Mott MacDonald Ltd surveyors as part of the Phase 1 survey as part of the PEA.

2.2 Updated Visit

An updated survey visit of the Cayley Embankment was undertaken on 28th May 2021 by an experienced Mott MacDonald Ltd ecologist within an optimal period where the majority of plants within the grassland could be identified to species level. This survey visit was conducted across the entire embankment to provide an updated classification of the habitats that exist therein and denote habitat indicators.

Documentation of detailed survey results and site photographs were peer reviewed by a FISC 6 botanist[3] who concurred with the findings of the surveyor and of the 2020 PEAR respective to the habitat categorisation of the Cayley Embankment.

[3] Whild & Townshend, 2007. Online: Microsoft Word - Botanical Skills Pyramid.doc (bsbi.org), accessed 08/06/21.

3. Survey results

3.1 Preliminary Ecological Appraisal

The 2020 PEAR recorded Cayley Embankment as area of c.0.8 hectares, and categorised the grassland across the area as Poor Semi-improved Grassland with scattered trees including Ash (*Fraxinus excelsior*), Elm (*Ulmus* sp.), Beech (*Fagus sylvatica*) and White Poplar (*Populus alba*).

The surveyor supported the classification of grassland with floristic survey data in which the PEAR reads:

"The grassland was dominated by fescue (Festuca sp.), with Yorkshire fog (Holcus lanatus) and false oat (Arrhenatherum elatius) found to the edges and occasional broadleaved dock (Rumex obtusifolius), greater plantain (Plantago major)."

3.2 Review of assessment

The JNCC 2010 Phase 1 Handbook describes an Improved Grassland (B4) as an area of permanent grassland that is highly enriched and dominated by graminoids, with a limited diversity of forbs within the sward. The handbook also goes on to state that lush, luxuriant growth of 50% or more of perennial rye-grass (*Lolium perenne*), white clover (*Trifolium repens*) and other agricultural species would suggest an improved sward. By contrast, a Poor Semi-improved Grassland (B6) differs in that it is more species rich and is more likely to resemble an impoverished neutral grassland.

Both the high abundance of graminaceous vegetation, and low abundance and diversity of forbs indicate a Poor Semi-improved sward. The occasional presence of greater plantain and broad-leaved dock also indicate previous enrichment with Ellenberg N values of 7 and 9, respectively.

3.3 Updated Visit

The updated visit during late May 2021 found the classification of the Cayley Embankment grassland to be consistent with the 2020 PEAR, being dominated by graminoides including perennial rye-grass, red fescue (*Festuca rubra*), yorkshire-fog, cock's-foot (*Dactylis glomerata*) and false oat-grass. Herbaceous species are generally occasional to rare within the sward which most commonly includes creeping buttercup (*Ranunculus repens*), daisy (*Bellis perennis*) and dandelion (*Taraxacum* sect. Ruderalia).

Positive grassland indicators were identified and exist as rare constituents of the sward. These include glaucous sedge (*Carex flacca*), red clover (*Trifolium pratense*) and common bird's-foot trefoil (*Lotus corniculatus*). The abundance of these plants is, however, currently low. Representative site photographs from the updated survey visit are found across Figure 2 below.

Figure 2: Site Photograph Selection (28th May 2021) showing a grass-rich, poor semi-improved sward

Source: Mott MacDonald Ltd, 2021

Structural diversity is limited to that provided between trees within the amenity grassland to the west, although some flower beds around the base of trees incorporate a limited suite of non-native plants (see Figure 3).

Figure 3: Flower Beds on Western Ridge

Source: Mott MacDonald Ltd, 2021

4.0 Interpretation and enhancement strategy

4.1 Interpretation

Cayley Embankment consists of an area of coastal, poor semi-improved grassland currently dominated by graminaceous vegetation and a limited diversity of herbaceous species, which includes species tolerant to high soil fertility and a scarcity of positive grassland indicators that show less tolerance to enriched soils. Alongside the permanent grassland across the embankment, the western edge is also landscaped with a range of tree species.

There is limited structural diversity within the area currently. The importance of structural diversity within grassland and other swards, particularly from native shrubs, is well documented across literature and best-practice guidance

Current management at this site consists of regular mowing to the western edge (which is used for amenity purposes and landscaped with trees and benches) and a less frequent mowing across the majority of the embankment. This management and the low structural diversity of the site creates conditions for poor species diversity.

4.2 Proposed strategy

To improve the biodiversity value of Cayley Embankment, a strategy is recommended which includes using translocation techniques aligned with IUCN and other best-practice standards, alongside a favourable management regime of grassland areas.

The strategy includes:

- Change of grassland management;
- Preparing and seeding the area with locally sourced green hay; and
- Improving structural diversity.

Green hay application has the following benefits over a seed mix (which should be applied as a last resort):

- Known, local provenance of plants; and
- Certainty that plants are native species/subspecies; and
- Likely improved genetic diversity of plants.

Use of native shrubs appropriate to the area would have numerous benefits at Cayley Embankment, which may include:

- An improvement to available edge habitat within the grassland improvement area; and
- Creating an improved resource for a variety of animals and fungi.

4.2 Green hay application

In order to improve the floristic diversity of the poor semi-improved coastal grassland across Cayley Embankment, green hay application across the site is recommended.

This method involves preparing the surface at Cayley Embankment through cutting of the grassland with removal of the arisings, and light scarification of the grassland surface during late July to October, followed by the spreading of cut material from a nearby old meadow (donor site) on to the prepared surface. This cut material would contain an abundance of seeds and fruits which would go to enhance diversity within the

sward. Hay cutting and application from the donor site would occur within the same day to prevent the hay crop from overheating and a significant reduction in seedling recruitment.

Green hay should be sourced locally and be from a meadow or old grassland and be screened for invasive plant species prior to spreading at Cayley Embankment through survey/an assessment of survey data at the donor site. To improve species richness and reduce abundance of dominant grasses, green hay should also be harvested from a site with yellow rattle (*Rhinanthus minor*), whose adaptations involve hemi-parasitism on various grasses. The introduction of yellow rattle on sites is known reduce vigour and abundance of grasses by up to 60%, and is frequently used in meadow recreation and restoration to improve floristic diversity[4].

Only cutting and light scarification of the grassland at Cayley Embankment would be used to prepare the surface (in preference to rotovation or ploughing which releases significant quantities of soil carbon and causes damage to existing soil biota).

4.3 Landscaping

Incorporation of shrubs alongside grassland pasture can greatly improve the quality of habitats, species diversity and ecosystem functionality[5].

A range of appropriate shrubs is given within Table 1 below.

Table 1: Appropriate shrubs for incorporation across the western ridge of Cayley Embankment

English name	Scientific name
Creeping Willow	*Salix repens*
Dyer's Greenweed	*Genista tinctoria*
Burnet Rose	*Rosa spinossisima*
Western Gorse	*Ulex gallii*
Spurge Laurel	*Daphne laureola*

Source: Mott MacDonald Ltd

In addition to the incorporation of woody shrubs within amenity areas of limited structural diversity, an old informal pathway down the Cayley Embankment is also proposed to be removed. Instead of removing this entirely, there is scope to allow for some landscaping for the creation of bee banks suitable for a variety of solitary bees in the area (see Figure 4) should it be permitted following consideration of health and safety risks.

Figure 4: Informal pathway to be removed

[4] Natural England Technical Information Note. Online: Natural England Technical Information Note TIN060 (everysite.co.uk), accessed 08/06/21

[5] Peterken, 2017. Online: British Wildlife | Recognising wood-meadows in Britain?, accessed 08/06/21.

Source: Mott MacDonald Ltd, 2021

4.4 Management

It is recommended that the management of the enhanced grassland across Cayley Embankment consists of a once or twice annual cut between the period August-February (see Table 2), whereby the grassland embankment is cut in its entirety[6]. All arisings should be removed off site, particularly within the first two years of establishment to prevent the development of a thatch, hindering establishment of plants seeded in from green hay.

Where shrubs are proposed to the western ridge of Cayley Embankment, pruning/arboricultural works are recommended to be undertaken at the discretion of CCBC, and outside of the main nesting period (March-August inclusive) where practicable.

4.5 Work Schedule

A prospective schedule of works is given in Table 2.

Table 2: Prospective work schedule for enhancement operations proposed for Cayley Embankment

Action	Jan	Fab	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Source old meadow locally, negotiate collection of green hay and screen for invasive plants.												
Cut and scarify areas of poor semi-improved grassland at Cayley Embankment and spread green hay cut sourced from a local, old meadow												

[6] Plantlife Guide. Online: Plantlife :: Good Verge Guide: your go-to guide for transforming local verges into wildlife havens, accessed 08/06/21

Action	Jan	Fab	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Cut and remove arisings at Cayley Embankment to maintain and improve grassland one year post application												
Plant appropriate native shrubs across suitable areas of the western ridge at Cayley Embankment.												
Prune trees/shrubs as appropriate/needed												

Source: Mott MacDonald Ltd, 2021

Appendix 9.8 – Pensarn Botanical Survey Report

MOTT MACDONALD

Colwyn Bay Waterfront Project Phase 2b

Botanical Survey Report Pensarn Beach

August 2021

Mott MacDonald
Mott MacDonald House
5 Woodland Road West
Colwyn Bay LL29 7DH
United Kingdom

T +44 (0)1492 534601
mottmac.com

Environment Roads & Facilities
Conwy County Borough Council
Mochdre Council Offices

Colwyn Bay Waterfront Project Phase 2b

Botanical Survey Report Pensarn Beach

August 2021

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Contents

Executive summary

Mott MacDonald Ltd was appointed by Conwy County Borough Council (CCBC) to undertake a botanical survey and assessment at Pensarn Beach, hereafter referred to as the 'Site'. The Site comprises of the proposed working area for the construction of a pipeline associated with beach recharge works for the Colwyn Bay Waterfront Project, and is located c.35m east of the Traeth Pensarn Site of Special Scientific Interest (SSSI). The Site is currently used as a car park. A number of semi-natural habitats occur at the site. This botanical survey and assessment follows recommendations contained within Natural Resources Wales (NRW) EIA Scoping response for the Colwyn Bay Waterfront Project Phase 2b received July 2021.

The survey was undertaken across the Site in July 2021 by an experienced Mott MacDonald botanical specialist, accompanied by an ecologist acting as a field assistant. The primary aims of this botanical survey were to identify important plant species of conservation importance that occur across the Site, which currently comprises Annex I shingle beach (H1210 and H1220).

The survey noted a large population of rough clover (*Trifolium scabrum*) estimated at approximately 800 individuals, whilst one plant of slender thistle (*Carduus tenuiflorus*) (district importance) was found immediately adjacent to the Site. Records of small-flowered catchfly (*Silene gallica*), a red-list Vulnerable and Welsh priority species are also present adjacent to the Site, although no plants were found on Site during the survey.

To avoid harm to important floristic features of regional to district importance, important species have been mapped on a constraints plan. Recommendations include the implementation of a buffer zone and/or boarding around the main areas occupied by rough clover, demarcated tracking routes for plant, erosion prevention measures as well as toolbox talks to site workers to highlight the importance of the SSSI and important species present in the area.

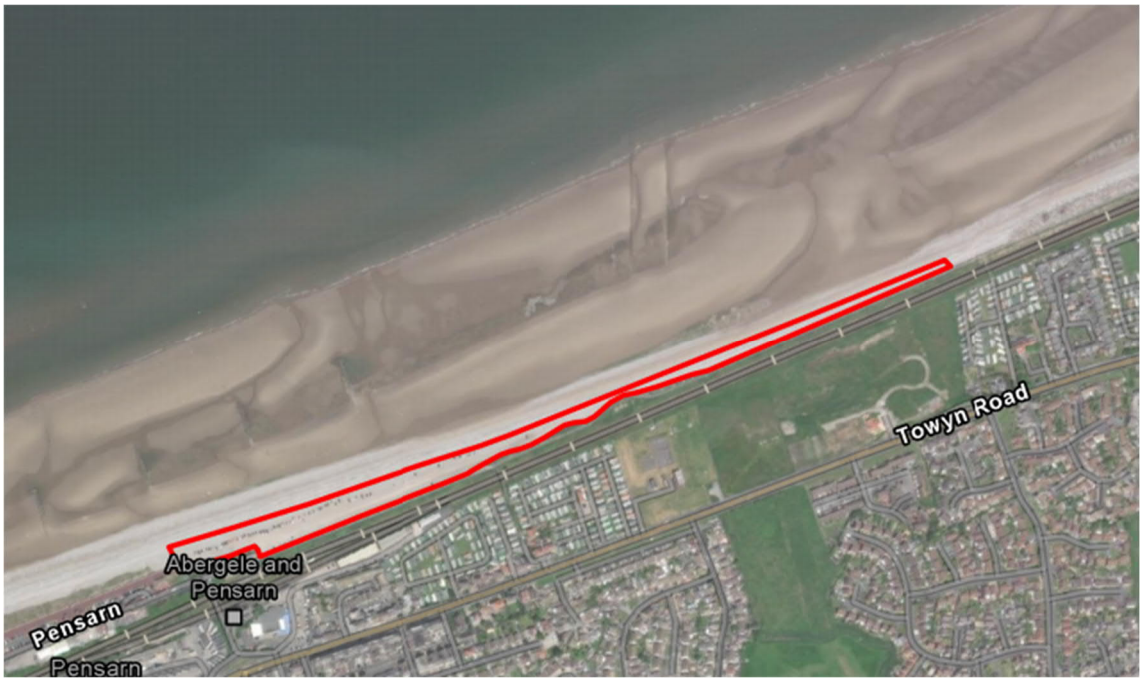
1 Introduction

1.1 Project Background

Mott MacDonald Ltd was appointed by Conwy County Borough Council (CCBC) to undertake a botanical survey and assessment of the Pensarn Beach Pipeline Construction Area (herafter referred to as the Site) (Figure 1.1) to inform the Colwyn Bay Waterfront Project Phase 2b (the Scheme).

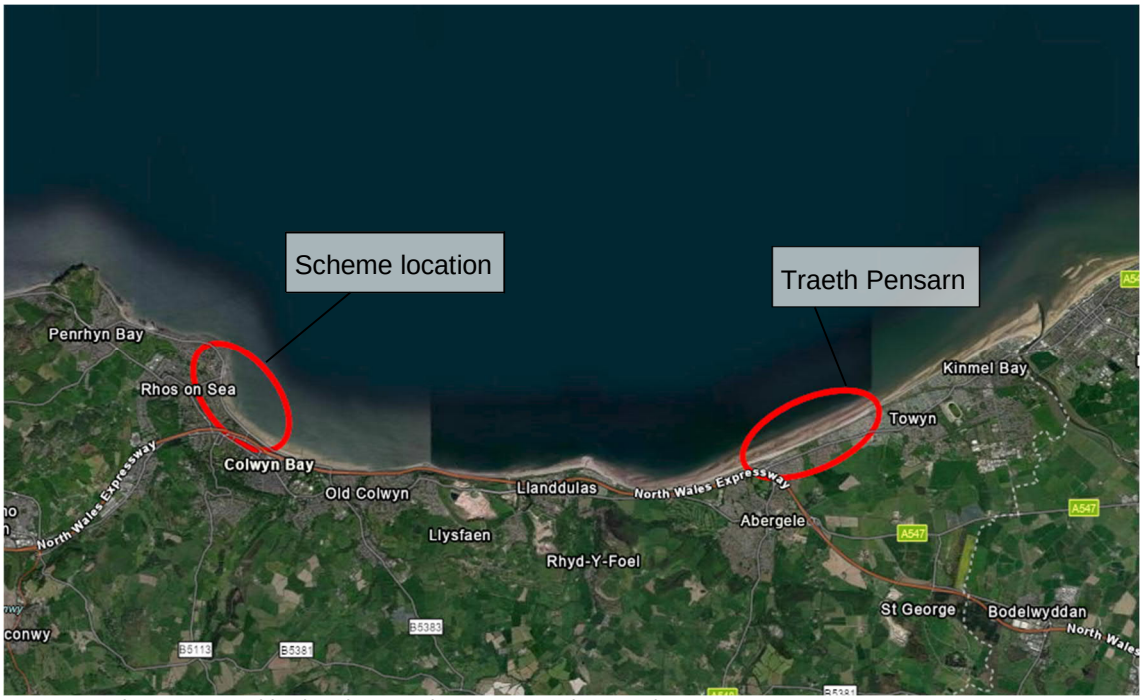
The Scheme comprises a combination of coastal defence and beach recharge as well as promenade and active travel improvements between Rhôs-on-Sea and Colwyn Bay, North Wales. In order to compete the proposed recharge works associated with the Scheme, Pensarn Beach was identified for the construction of the pipeline, which would be subsequently be filled with air and floated to the Scheme by sea (see Figure 1.2). The Site is currently used as a car park

Figure 1.1: Site Boundary



Source: Adapted from Drawing 100374-MMD-00-XX-DR-N-0020: Pensarn Pipeline Construction Area Red Line Boundary

Figure 1.2: Approximate locations of the Traeth Pensarn (Pensarn Beach) Site and Colwyn Bay Waterfront Phase 2b Scheme



Source: Earthstar Geographics | Esri UK, Esri, HERE, Garmin, METI/NASA, USGS

It is expected that the pipeline materials would be brought to the Site by road using the existing beach car park access and the upper car park as a compound. Sections of pipe would be laid out on the beach just above the mean spring high tide mark using land based plant and welded together two form two long sections. Over two consecutive spring high tides it is anticipated that the first section would be floated out to sea and welded to the end of the second resulting in one 1.6-1.8km long pipeline. Filled with air, this would be floated and transported by tug to Colwyn Bay.

The Site lies in close proximity to Traeth Pensarn Site of Special Scientific Interest (SSSI), which is situated 35m to the west. Traeth Pensarn has been designated for its vegetated shingle, including a number of important and characteristic plants. The Natural Resources Wales (NRW) EIA Scoping response received July 2021, relayed a requirement for further botanical survey across the Site in order to assess the potential impacts of the pipeline construction on important floristic features within the Site.

1.2 Scope of Works

The primary aims of the botanical survey were to identify the presence or otherwise of plant species of conservation importance at the Site, which could be affected by the proposed construction work. The survey area comprised the Pensarn pipeline construction area, shown in Figure 1.1: Site Boundary 1.

1.3 Aims and Objectives

The specific objectives of the botanical survey report are to:

- Identify any protected and/or notable plant species of conservation importance, which may occur on or in close proximity to the Site;

- Recommend mitigation and offsetting opportunities in alignment with best-practice and to ensure no important plant species/habitats are permanently lost as a result of the proposed construction activities; and
- Identify the presence of any invasive plant species on or adjacent to the Site.

1.4 Legislative and Policy Framework

The construction and operational activities at the Site must comply with UK nature conservation legislation, and with national and local biodiversity policies. The main pieces of legislation in the UK are the Conservation of Habitats and Species Regulations 2017 (as amended)[1] , the Wildlife and Countryside Act (WCA) 1981 (as amended)[2] and The Environment (Wales) Act 2016[3].

Other key legislation/national policies which must be considered are:

- Planning Policy Wales (PPW), Edition 11[4];
- Conwy Local Development Plan, Adopted October 2013[5,6];
- The UK Post-2010 Biodiversity Framework (2012)[7]; and
- Nature Recovery Action Plan 2020-21 (2020)[8].

Under Section 7 of the Environment (Wales) Act 2016 which replaces section 42 of the NERC Act 2006, a list of priority habitats and species was drawn up. Under this Act, all public bodies are required to have regard to biodiversity conservation when carrying out their function.

1.5 Quality Assurance & Environmental Management

All surveys and assessments have been undertaken with reference to the recommendations given in 'BS 42020:2013 Biodiversity: Code of practice for planning and development'.

[1] Gov.uk. Conservation of Habitats and Species Regulations 2017 (as amended) [Online] Available at: The Conservation of Habitats and Species Regulations 2017 (legislation.gov.uk) [Accessed July 2021]

[2] Gov.uk Wildlife and Countryside Act 1981 (as amended) [Online] Available at: Wildlife and Countryside Act 1981 (legislation.gov.uk) [Accessed July 2021]

[3] Gov.uk Environment (Wales) Act 2016 [Online] Available at: Environment (Wales) Act 2016 (legislation.gov.uk) [Accessed July 2021]

[4] Welsh Government, February 2021. Planning Policy Wales, Edition 11 [Online] Available at: Planning Policy Wales - Edition 11 (gov.wales) [Accessed July 2021]

[5] Conwy County Borough Council, Conwy Local Development Plan 2007-2022 [Online] Available at: Conwy Local Development Plan 2007-2022 [Accessed July 2021]

[6] Note: A replacement local development plan is currently being produced however, due to the Covid-19 pandemic this is not currently available [Accessed July 2021]

[7] JNCC and Defra, 2012. UK Post-2010 Biodiversity Framework [Online] Available at: UK Post-2010 Biodiversity Framework (jncc.gov.uk) [Accessed July 2021]

[8] Welsh Government, 2020. The Nature Recovery Action Plan for Wales 2020-21 (originally the Nature Recovery Plan) [Online] Available at: The Nature Recovery Action Plan for Wales 2020 to 2021 (gov.wales) [Accessed July 2021]

2 Methods

2.1 Desk Study

For the purposes of this assessment, statutory and non-statutory designated sites within 1.0km of the Site and species records within and directly adjacent to the survey area have been considered. Prior to the Site visit, a number of resources were investigated for floristic information:

- Botanical Society of Britain and Ireland (BSBI) maps[10];
- Botanical Society of Britain and Ireland GB Red list for Vascular Plants[11];
- Plantlife's Important Plant Areas (IPA) database[12];
- Natural Resources Wales, Protected Areas of Land and Sea[13];
- Natural Resources Wales, Lle Geoportal[14]; and
- Biological records data provided by Cofnod, the North Wales Environmental Information Service[15].

2.2 Rare and Protected Plant Survey

A detailed search for important flora was undertaken for the defined survey area (Figure 1.1: Site Boundary 1). This was done using a bespoke transect methodology (based on standard methods in Hill *et al*, 2005[16]) and was led by a certified FISC[17] 6 Mott MacDonald Ltd botanist accompanied by an ecologist acting as a field assistant. Transects were walked through the Site, 20m apart as a maximum where vegetation was present. Data collection was designed to provide an indication of abundance and distribution of important plants in the survey area.

Rare and protected higher and lower plants (bryophytes) were recorded along each transect, using a handheld GPS to record the locations of discrete populations. The number of individual plants (where appropriate) and the extent of each population was also recorded. See Appendix A for representative site photographs. For the purposes of this report, important plants were characterised based upon the following:

- Species with special legal protection (e.g. species listed across Schedule 8 WCA);
- Priority species listed under Section 7 of the Environment (Wales) Act 2016;
- Priority species listed within the Conwy Local Biodiversity Action Plan;
- Red-listed species[11,18,19];
- Species listed within relevant Rare Plant Registers;
- Nationally rare/scarce species; and
- Species at the edge of their range.

[10] Botanical Society of Britain and Ireland, Distribution maps [Online] Available at: Distribution maps – Botanical Society of Britain & Ireland (bsbi.org)

[11] Botanical Society of Britain and Ireland (2021). GB Red list for Vascular Plants [Online] Available at: https://bsbi.org/taxon-lists

[12] Plantlife, 2021. Important Plant Areas (IPA) database [Online] Available at: PlantLife Important Plant Areas (plantlifeipa.org)

[13] Natural resources Wales, Find Protected Areas of Land and Sea [Online] Available at: Natural Resources Wales / Find protected areas of land and sea

[14] Natural resources Wales, Lle Geoportal [Online] Available at: Lle - Home (gov.wales)

[15] Cofnod [Online] Available at: Cofnod - North Wales Environmental Information Service | Home

[16] Hill, D et al, 2005. Handbook of Biodiversity Survey Methods – Survey Evaluation and Monitoring, Cambridge University Press.

[17] Botanical Society of Britain and Ireland Field Identification Skills Certificate

[18] Plantlife Wales, 2008. A Vascular Plant Red Data List for Wales [Online] Available at: Layout 1 (bsbi.org)

[19] Plantlife Wales, 2012. A Bryophyte Red Data List for Wales [Online] Available at: Plantlife :: A Bryophyte Red Data List for Wales

Note: CCBC are currently defaulting to Section 7 priority habitats and species whilst a Nature Recovery Action Plan is being produced through the Bionet North East Wales Regional Local Nature Partnership[20].

Where important species have been identified, a Geographic Frame of Reference was adopted to characterise relative importance at a geographic scale, from international to local. Assessment of plants is aligned with CIEEM's standing advice on the identification of important ecological features[21].

If plants could not be identified to species level at the time of the survey, photographs were taken and material collected as necessary. If determination was not possible, verification was sought using the Botanical Society of Britain and Ireland referee system and relevant publications[22,23,24].

A full species list was obtained from the time of the survey (Appendix B) whereby the relative abundance of taxa is indicated with use of the DAFOR scoring system. Plants that are dominant are indicated by the letter 'D', abundant with 'A', frequent with 'F', occasional with 'O' and rare with 'R'. The letter 'L' may also be used to indicate that a plant could be localised.

2.3 Limitations

This report assesses the baseline botanical importance of the Site but does not constitute a full assessment of its importance for other ecological receptors.

Ecological surveys are limited by factors such as time of year, which affect the ability to detect plants. Optimal survey times vary between species and species groups therefore a single survey visit may not be sufficient to identify plants that are not usually visible during July.

A Phase 2 habitat survey, also known as a National Vegetation Classification (NVC) was not undertaken in tandem with this botanical survey assessment, the focus of which was on recording the presence of important taxa. The purpose of a Phase 2 survey in the context of a proposed development would be to identify both Annex I and priority habitats. This information, however, is already known for the Site, with sparsely vegetated shingle across the NVC categories SD1-SD3 being widespread across the Site and adjacent shingle beach areas. As impacts to the broader habitat are absent from the Proposed Scheme, this is not considered to be a significant limitation.

[20] Bionet wales, 2021 [Online] Available at: Nature Recovery Plan - Bionet (bionetwales.co.uk)

[21] CIEEM, 2018. Guidelines for Ecological Impact Assessment in the UK and Ireland [Online] Available at: ECIA-Guidelines-2018-Terrestrial-Freshwater-Coastal-and-Marine-V1.1Update.pdf (cieem.net)

[22] Atherton, I., Bosanquet, S. D., & Lawley, M. (Eds.) (2010). Mosses and liverworts of Britain and Ireland: a field guide. Plymouth: British Bryological Society.

[23] Rodwell, J. S. (Ed.). (2000). British Plant Communities: Volume 5, Maritime Communities and Vegetation of Open Habitats. Cambridge University Press.

[24] Stace, C. (2019). New flora of the British Isles. Fourth Edition, C&M Floristics.

3 Results

3.1 Desk Study

3.1.1 Designated Sites

3.1.1.1 Statutory Designated Sites

One statutory designated site was identified within 1.0km of the Site; Traeth Pensarn SSSI, located c.35m west. Citation details for the SSSI have been outlined in Table 3.1 below.

Table 3.1: Site Citation Details

National Site Network Site(s)	**Traeth Pensarn SSSI**
Distance from the closest part of the project	35m west
Description of the site	
Key Qualifying feature	**Coastal vegetated shingle beach**
Details	The vegetated shingle at Traeth Pensarn represents more than 10% of the total area of this habitat in Wales. The shingle beach is composed of both pioneer and stabilised plant communities. **Pioneer communities** Found near the seaward ridge of the shingle, owing to the occasional movement of shingle and inundation by sea water during high tides and storms, many areas of the frontal ridge are relatively bare of vegetation. Species such as yellow horned-poppy (*Glaucium flavum*), curled dock (*Rumex crispus*) and the locally rare sea kale (*Crambe maritima*). Regularly associated with these are plants such as sea fern-grass (*Catapodium marinum*), sea beet (*Beta vulgaris* subsp. Maritima), sea campion (*Silene uniflora*) and sea mayweed (*Tripleurospermum maritimum*). Where shingle has become buried in sand, species such as sea holly (*Eryngium maritimum*), sand couch (*Elytrigia juncea*) lyme grass (*Leymus arenarius*) and sea sandwort (*Honckenya peploides*) are more typical. **Stabilised communities** This community exists landwards of the crest, where fine sediments are trapped within the shingle and cobble, allowing the formation of a more stable community. Nutrient and water availability is still limited however, specialised plant species include red fescue (*Festuca rubra*), common restharrow (*Ononis repens*), smooth hawk's beard (*Crepis capillaris*), sea mouse-ear (*Cerastium diffusum*), kidney vetch (*Anthyllis vulneraria*), lady's bedstraw (*Galium verum*), sea radish (*Raphanus raphanistrum* subsp. *maritimus)* and yarrow (*Achillea millefolium*). Bryophytes such as *Tortula ruralis ruraliformis* and *Bracythecium albicans* also occur here. Historically, the nationally scarce oysterplant (*Mertensia maritima*) has been located at this Site.
Management of the site	
Vision of the site	The management statement for the SSSI outlines the vision of the site: *"The natural coastal processes of wave and tidal movement of limestone cobbles and mixed sand along the beach will take place. This will maintain a dynamic shingle beach, which does not suffer from net erosion.*

National Site Network Site(s)	Traeth Pensarn SSSI
	The frontal ridge of the beach, although sparsely vegetated, should in summer display the brightly coloured flowers and succulent leaves of plants such as sea kale, yellow horned-poppy, sea holly and curled dock. These areas of 'pioneer' vegetated shingle should continue to make up at least 40% of the area of the vegetated beach. *A more densely colonised region of 'stabilised shingle', characterised by species such as common restharrow, red fescue, lady's bedstraw and sea radish, should be present on the top of the beach. These species will always be present in spring and summer months but will not make up more than 50% of the area of the vegetated shingle."*

Source: Natural resources Wales

3.1.1.2 Non-statutory Designated Sites

The nearest Important Plant Area (IPA) is the Great Orme's Head/Pen y Gogarth IPA, located 17km north-west of the site.

Five candidate Local Wildlife Sites are located within 1.0km of the Site, all are separated by the North Wales Coast railway line. The nearest is the North Wales Holiday Camp (candidate site) located c.35m south of the Site and comprises an area of neutral grassland, all other sites are located over 280m from the Site.

3.1.2 Protected and Priority Species Records

No records of plants were returned from within the Site, although one important species has recently been recorded within 50m of the Site, small catchfly (*Silene gallica*), a red-list vulnerable plant priority species in Wales. This plant has been recorded in three locations at 2m and 8m north and 296m south-east of the Site, the location of these records is shown in Appendix C.

3.2 Rare and Protected Plant Survey

3.2.1 Overview

The Site comprises coastal vegetated shingle, an Annex 1 and Section 7 Priority Habitat. One notable plant species (rough clover) was identified on Site at the time of the survey visit, this species is rare in North Wales and has been assessed as having regional importance. Other plant species present on the Site were of no more than local conservation importance.

A single plant of slender thistle was also located immediately outside of the survey area adjacent to a portion of sea wall, this is considered to be of district importance.

The locations of these species are shown in Appendix C.

3.2.2 Rough clover – Regional Importance

Rough clover (*Trifolium scabrum*) is a low-growing, short-lived, plant typical of short grassland in open places, typically on sandy ground, particularly near to the sea. This plant is rare across North Wales, being known from a small number of sites and occupying nine hectads (10km-10km grid square) across the region, including Pensarn (see Trifolium scabrum distribution map (BSBI)). This species is notified as being rare in the Denbighshire (VC50) County Rare Plants Register (RPR)[25].

[25]BSBI, 2014. Denbighshire VC50 Rare Plant Register [Online] Available at: DenbighshireRPR2014.pdf (bsbi.org)

The presence of rough clover at Traeth Pensarn has been determined to be of regional conservation importance based upon the following determinants:

- Identified within the Denbighshire VC50 County RPR; and
- Rare across North Wales.

A total of circa 800 plants were identified at the site across areas of beach, typically confined to vegetated grassy margins to the south, although scattered populations were present on shingle. Areas occupied by rough clover are shown in Appendix C.

3.2.3 Slender thistle – District importance

Slender thistle (*Carduus tenuiflorus*) is a tall, biennial plant typical of rough, open ground and occurs mostly close to the coast. In North Wales, this species has a scattered distribution along the coast, and is locally frequent in proximity to the Great Orme (see Carduus tenuiflorus distribution map (BSBI)).

The presence of slender thistle at Pensarn has been determined to be of district-wide/county conservation importance because it is uncommon and scattered in the district.

One plant was observed immediately outside the Site boundary adjacent to the sea wall (see Appendix C).

3.3 Invasive Species

No invasive plant species (listed on Schedule 9 of the WCA 1981, as amended) were present on or near to the Site.

4 Interpretation and Recommendations

4.1 Baseline Botanical Importance

The western extent of the Site is 35m east of Traeth Pensarn SSSI, designated for its Annex 1 coastal vegetated shingle. The Site itself, although situated outside of the SSSI, also comprises an Annex 1 and Section 7 priority habitat, Coastal Vegetated Shingle, however impacts to the broad habitat type and its various conservation designations are considered to be negligible as the development is of a small scale and will not result in any permanent habitat loss.

The Site supports a large (100+) population of rough clover and is adjacent to a single plant of slender thistle. The populations of rough clover and slender thistle have been assessed as being of Regional and District conservation importance, respectively.

It is considered that if unmitigated the development could have adverse impacts on the population of rough clover. This plant favours established, compacted areas of shingle beach. If these areas are modified during pipeline construction there may be a permanent reduction in suitable habitat on the Site and the population may be permanently reduced or lost as a result of development due to a loss of compacted short vegetation where this plant grows.

Three records of small-flowered catchfly were returned adjacent to the Site, this species is listed as a Section 7 Priority Species however, it was not identified on Site during the survey and is not considered further.

4.2 Recommendations and Further Inputs

4.2.1 Mitigation

The following mitigation measures are recommended for the proposed pipeline construction at Traeth Pensarn.

- Creation of fenced buffer zones (minimum 2m buffer) around areas occupied by rough clover to prevent trafficking over these areas;
- Where this is not possible, it is recommended that boards are placed across occupied areas to ensure that no excessive disturbance from heavy plant removes favourable habitat for rough clover;
- Construction of a visual barrier to prevent construction vehicles entering with 30m of the SSSI boundary;
- Marked tracking zones for tracking of plant and erosion prevention measures (to include restricting plant movement on vegetated and unvegetated ground, avoidance of repeated tracking and the provision of erosion matting); and
- Toolbox talks given to contractors prior to the commencement of works to highlight the importance of the SSSI and important species present in the area.

Through the application of buffer zones, boarding and other measures as detailed above, impacts to all identified important floristic and habitat features may be avoided without the requirement for compensation.

Note: Translocation could be considered as a means of mitigating impacts on rough clover; however, this plant appears to occupy a specific niche across the beach, including compacted soils with short vegetation. Translocation is likely to fail if this niche cannot be replicated and is considered high-risk.

Appendices

A. Site Photographs

B. Site Species List

C. Pensarn Rare Plants Drawing

A. Site Photographs

Figure A.1: looking east across the shingle beach, southern Site boundary

Source: Mott MacDonald Ltd, 2021

Figure A.2: Looking across the eastern aspect of the Site with sea sandwort *Honkenya peploides*

Source: Mott MacDonald Ltd, 2021

Figure A.3: Rough clover *Trifolium scabrum*

Source: Mott MacDonald Ltd, 2021

Figure A.4: Looking east along the southern Site boundary

Source: Mott MacDonald Ltd, 2021

Figure A.5: Slender thistle *Carduus tenuiflorus* present adjacent to the sea wall

Source: Mott MacDonald Ltd, 2021

Figure A.6: Looking east across the car park (proposed compound area)

Source: Mott MacDonald Ltd, 2021

Figure A.7: Looking west across the Site

Source: Mott MacDonald Ltd, 2021

Figure A.8: Sea holly *Eryngium maritimum*

Source: Mott MacDonald Ltd, 2021

Figure A.9: Sea kale *Crambe maritima*

Source: Mott MacDonald Ltd, 2021

B. Site Species List

English Name	Scientific Name	DAFOR	Comments
Dandelion	*Taraxacum* sect. Ruderalia	O	
Annual meadow-grass	*Poa annua*	O	
Black medick	*Medicago lupulina*	O	
Buck's-horn plantain	*Plantago coronopus*	O	
Red fescue agg.	*Festuca rubra* agg.	O	
Restharrow	*Ononis repens*	O	
Sea beet	*Beta vulgaris* subsp. *maritima*	O	
Sea fern-grass	*Catapodium marinum*	O	
Sea kale	*Crambe maritima*	O	
Sea mayweed	*Tripleurospermum maritimum*	O	
Sea radish	*Raphanus raphanistrum* subsp. *maritimum*	O	
Smooth hawk's-beard	*Crepis capillaris*	O-R	
Horned poppy	*Glaucium flavum*	O-LF	
Curled Dock	*Rumex crispus*	LF	
Rough clover	***Trifolium scabrum***	**LF**	Regional conservation importance - rare across North Wales
Pointed spear-moss	*Calliergonella cuspidata*	R	
Sandhill screw-moss	*Syntrichia ruralis* subsp. *ruraliformis*	R	
Whitish feather-moss	*Brachythecium albicans*	R	
a bramble	*Rubus* ser. Sylvatici	R	
a dandelion	*Taraxacum* sect. Hamata	R	
Alexanders	*Smyrnium olusatrum*	R	
Autumn hawkbit	*Scorzoneroides autumnalis*	R	
Barren brome	*Anisantha sterilis*	R	
Biting stonecrop	*Sedum acre*	R	
Bristly ox-tongue	*Helminthotheca echioides*	R	
Cock's-foot	*Dactylis glomerata*	R	
Common bird's-foot trefoil	*Lotus corniculatus*	R	
Common mallow	*Malva sylvestris*	R	
Common nettle	*Urtica dioica*	R	
Creeping cinquefoil	*Potentilla reptans*	R	
Creeping thistle	*Cirsium arvense*	R	
Daisy	*Bellis perennis*	R	
Fleabane sp.	*Conyza* sp.	R	
Goatsbeard	*Tragopogon pratensis*	R	
Great plantain	*Plantago major*	R	

English Name	Scientific Name	DAFOR	Comments
Hoary cress	*Lepidium draba*	R	
Hogweed	*Heracelum sphondylium*	R	
Knotgrass	*Polygonum aviculare*	R	
Lesser burdock	*Arctium minus*	R	
Lesser hawkbit	*Leontodon saxatilis*	R	
Lucerne	*Medicago sativa* subsp. *sativa*	R	
Marram	*Ammophila arenaria*	R	
Meadow buttercup	*Ranunculus acris*	R	
Oxford ragwort	*Senecio squalidus*	R	
Perennial rye-grass	*Lolium perenne*	R	
Perennial sow-thistle	*Sonchus arvensis*	R	
Pineappleweed	*Matricaria discoidea*	R	
Potato	*Solanum tuberosum*	R	
Railway bramble	*Rubus tuberculatus*	R	
Red clover	*Trifolium pratense*	R	
Red valerian	*Centranthus ruber*	R	
Ribwort plantain	*Plantago lanceolata*	R	
Sand couch	*Elymus junceiformis*	R	
Sea holly	*Eryngium maritimum*	R	
Sea mouse-ear	*Cerastium diffusum*	R	
Sea pearlwort	*Sagina maritima*	R	
Sea sandwort	*Honkenya peploides*	R	
Slender thistle	***Carduus tenuiflorus***	**R**	District-wide conservation importance. Scattered across North Wales. One plant on adjacent sea wall.
Smooth sow-thistle	*Sonchus oleraceus*	R	
Soft brome	*Bromus hordeaceous*	R	
Spear thistle	*Cirsium vulgare*	R	
Spear-leaved orache	*Atriplex prostrata*	R	
Squirrel-tail fescue	*Vulpia bromoides*	R	
Wall barley	*Hordeum murinum*	R	
White clover	*Trifolium repens*	R	
Wild carrot	*Daucus carota*	R	
Yarrow	*Achillea millefolium*	**R**	

C. Pensarn Rare Plants Map

Location Map

Key to Symbols

Anticipated boundary of pipeline construction area

Rare plant

- Rough Clover (Trifolium scabrum)
- Slender Thistle (Carduus tenuiflorus)

Notes

1. For information only, not for construction.
2. Contains OS data © Crown Copyright and database right 2020 Contains data from OS Zoomstack, Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	17/08/21	SL	For information	CW	NH

MOTT MACDONALD

Mott MacDonald House
5 Woodland Road West
Colwyn Bay
LL29 7DH
T +44 (0)2920 467800
W www.mottmac.com

Client

CONWY
CYNGOR BWRDEISTREF SIROL
COUNTY BOROUGH COUNCIL

Conwy County Borough Council
Environment, Roads & Facilities
Mochdre Offices
Colwyn Bay
Conwy
LL32 8DU

Title

Colwyn Bay Waterfront Project Phase 2b
Pensarn Beach Pipeline Construction Area
Rare Plants

Designed	J Styles	JS	Eng. Check	C Williams	CW
Drawn	S Li	SL	Coordination	N Spofforth	NS
GIS Check	S Anstice	SA	Approved	N Haines	NH

Scale at A3	Status	Rev	Security
1:5,000	INF	P1	STD

Drawing Number
100374-MMD-00-XX-DR-N-0026

0 50 100 150 200 250 Meters

C:\Users\LI95314\Mott MacDonald\100100374 - Colwyn Bay Phase 2b Detailed Design - GIS\Workspace\Ecology\Colwyn Bay Phase 2b - Rare Plants.aprx

Appendix 9.9 – Biosecurity Risk Assessment

MOTT MACDONALD

Colwyn Bay Waterfront Phase 2b

Bio-Security Risk Assessment

August 2021

Mott MacDonald
Mott MacDonald House
5 Woodland Road West
Colwyn Bay LL29 7DH
United Kingdom

T +44 (0)1492 534601
mottmac.com

Environment Roads & Facilities
Conwy County Borough Council
Mochdre Council Offices

Colwyn Bay Waterfront Phase 2b

Bio-Security Risk Assessment

August 2021

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
P01	16/08/2021	A. Jones E. Haggett	D. Jones C. Williams	N. Haines	First issue

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Contents

1 Introduction

1.1 Overview

This bio-security risk assessment (BSRA) has been produced in support of Phase 2b of the Colwyn Bay Waterfront Project, hereafter referred to as "the Scheme". This BSRA outlines the potential hazards relating to the introduction and spread of invasive and non-native species (INNS) on site for the Scheme.

The Scheme will involve working on land, within the intertidal zone and will also include beach recharge using dredged materials from offshore, delivered via pipeline (with the dredger and tug moored offshore). The pipeline would be constructed at Pensarn Beach approximately 9.5km east of the main Scheme location. As a result, INNS relating to the terrestrial and marine environments have been considered both for the Scheme and the Pensarn pipeline construction area.

Prior to implementing this risk assessment on site, a site briefing and a toolbox talk should be provided to all site workers regarding the importance of bio-security. The required inspection, preventative and management techniques for personnel should be outlined and pest/containment identification should also be explained to ensure rapid and appropriate responses to any INNS present, (if INNS are found on site, the Ecological Clerk of Works (ECoW) where present or Supervisor should be notified, and guidance should be sought with statutory agencies). An ecological walkover survey should be undertaken on site approximately 6-8 weeks prior to the construction phase commencing (this should be undertaken by both a suitably qualified marine ecologist and a suitably qualified terrestrial ecologist). This will provide an opportunity to confirm any new occurrences of INNS on site and for these to be managed suitably prior to works starting.

Formal standardised reporting to Natural Resources Wales (NRW)[1] should be implemented on site throughout the duration of the works regarding the presence of INNS should any be discovered.

1.2 Terrestrial INNS

A Preliminary Ecological Appraisal Report (PEAR) was produced for the whole of Colwyn Bay (including the Scheme area and the Old Colwyn Coastal Defence and Active Travel Scheme)[2] in 2020 along with further supplementary assessments (both terrestrial and intertidal) undertaken from February to July 2021 for the Scheme and Pensarn Beach areas. During these surveys no invasive plant species were identified on site. However, it is noted that INNS can be introduced into the site through poor bio-security protocols and construction practice, so a precautionary approach for the management of terrestrial INNS on site is outlined in Section 2 in addition to the management of marine INNS.

1.3 Marine INNS

Intertidal surveys were undertaken on the 25th and 26th March 2021[3] across the Scheme and Pensarn Beach areas. No INNS were identified during these visits. However, due to the beach recharge element of the Scheme, precautionary measures to manage potential INNS within the marine environment need to be outlined.

[1] NRW Reporting online: Natural Resources Wales / Report an incident, accessed August 2021

[2] Mott MacDonald, 2020. Preliminary Ecological Appraisal Colwyn Bay (Doc ref: 410895-MMD-N-R-00-XX-1701)

[3] Mott MacDonald Ltd, 2021, Colwyn Bay Waterfront Intertidal Survey Report (Doc ref: 100374-MMD-00-XX-RP-N-0002)

The Marine Strategy Framework Directive (MSFD) (2008) outlines a monitoring list for INNS. These INNS listed by the MSFD are further outlined within the "Priority Monitoring and Surveillance List of Marine INNS for Wales"[4] and have been categorised into "High Risk" and "Medium Risk" INNS. A "Low Risk" category also exists, but there are no low risk INNS considered to require monitoring by the MSFD.

The "High" and "Medium" risk INNS listed by the MSFD have been reviewed and INNS from these categories that are believed to have the potential to interact with the site as a result of the beach recharge activities and general works on the foreshore have been considered for this BSRA. These species considered for this risk assessment are outlined below:

1.3.1 High Risk INNS

- Compass sea squirt (*Asterocarpa humilis*) – potential for introduction through fouling (via the use of anchors, marine vessels and marine plant within the marine environment);
- Carpet sea squirt (*Didemnum vexillum*) – potential for introduction through fouling (via the use of anchors, marine vessels and marine plant within the marine environment);
- Chinese mitten crab (*Eriocheir sinensis*) – potential for introduction through ballast water (from the use of marine vessels for beach recharge activities); and
- Red ribbon bryozoan (*Watersipora subatra*) – potential for introduction through fouling (via the use of anchors, marine vessels and marine plant within the marine environment).

1.3.2 Medium Risk INNS

- Bonnemaison's hook weed (*Bonnemaisonia hamifera*) – potential for introduction through fouling and ballast water (via the use of anchors, marine vessels (and associated ballast water) and marine plant within the marine environment);
- Japanese skeleton shrimp (*Caprella mutica*) – potential for introduction through fouling (via the use of anchors, marine vessels and marine plant within the marine environment);
- Orange striped anemone (*Diadumene lineata*) – potential for introduction through fouling (via the use of anchors, marine vessels and marine plant within the marine environment);
- Japanese wireweed (*Sargassum japonica*) – potential for introduction through fouling (via the use of anchors, marine vessels and marine plant within the marine environment);
- Leathery sea squirt (*Styela clava*) – potential for introduction through fouling (via the use of anchors, marine vessels and marine plant within the marine environment); and
- Wakame, Asian kelp (*Undaria pinnatifida*) – potential for introduction through fouling (via the use of anchors, marine vessels and marine plant within the marine environment).

[4] Gov.Wales, December 2017. Marine Invasive Non-Native Species Priority Monitoring and Surveillance List for Wales [Online] Available at: https://gov.wales/sites/default/files/publications/2018-02/invasive-aquatic-species-priority-marine-species.pdf

2 Bio Security Risk Assessment

The risk assessment in

Hazard	Who or what might be affected?	Initial Assessment			Risk Control Measures	Residual Risk		
		Severity	Likelihood	Assessed Risk		Severity	Likelihood	Assessed Risk
Land Based Plant								
Use of land-based plant on the foreshore	Land-based plant will be used in the intertidal zone for the removal of sections of revetment, modification of outfalls, repairs and rock groyne improvements. This provides the opportunity for the spread of INNS across the intertidal area.	4	M	AR	Sections of the plant that would come into direct contact with the intertidal area (track/wheels) should be thoroughly cleaned before and after use to avoid the spread of any INNS (e.g. wheel washing facilities should be provided). This will also prevent potential spread from the Scheme's site area into other sites that may be used after the Scheme's construction is completed. If the risk is deemed to increase as a result of the discovery of INNS, the use of intertidal tracking matting should be considered. The number of vehicles used on site and the frequency at which they enter the intertidal area should be limited (vehicles should only enter the intertidal area on an ebb tide when there is a suitable dry area available for working).	2	L	A
Machinery origins/ previous works	Machinery travelling or having previously worked on different sites has the potential to introduce non-native or non-localised species to site.	4	H	UA	A stringent system of vehicle maintenance and cleanliness should be implemented during construction works, including frequent vehicle washing between road and beach access. A CEMP should be adhered to and available on site and NRW Pollution Prevention Guidelines should be followed.	3	M	AR

Promenade works	Material used for improvement works to the promenade may introduce alien species or spread existing species and/or pathogens on site.	3	H	AR	Where possible, existing material should be reclaimed, therefore lowering the risk of the introduction of invasive species. Any brought in material should be bespoke. If this is not possible, it should be ensured that brought in material hasn't been utilised in the marine environment previously. Again, if this is not possible, material brought in should be screened for INNS ahead of its use on site.	2	L	A
PPE – contractor staff, operatives and sub-contractors	PPE can collect contaminants including mud, seeds, pathogens etc. which can easily be transferred to and between sites.	4	VH	UA	All PPE especially footwear, Velcro closures, gloves, etc. should be thoroughly inspected and cleaned before arrival on site. Boot washing as well as equipment cleaning facilities (with a biocide such as Virkon) should be provided and carried out when entering and exiting site. Ideally equipment should then be allowed to dry for 48 hours before it is used elsewhere (a different site). Transfer between work areas on site should be avoided and minimised where possible. Measures for biosecurity in the field are also further outlined in NNSS guidance.	3	M	AR
Use of brought-in green hay at Cayley embankment	In order to ensure a local seed mix is successfully used for ecological improvements at Cayley embankment, green hay will be cut and brought in from a donor site.	3	H	AR	Green hay should be sourced locally and be from a meadow or old grassland that has been screened for invasive plant species prior to spreading at Cayley embankment through survey/an assessment of survey data at the donor site.	2	L	A
Marine Vessels/Plant								
Ballast Water	It is currently anticipated that a dredger and associated tug will be utilised for the beach recharge element. It may be necessary for these ships to take on board ballast waters from seas of different nations and to then dispose of these in UK waters (and vice versa). This could result in the spread of INNS in the form of marine microbes, plants and	4	H	UA	All vessels and associated staff must ensure adherence to the Ballast Water Management Convention, 2017 for each vessel required for the works. This legislation outlines the requirements for each vessel to have a ballast water management plan, a ballast water record book and an international ballast water management certificate. Vessels should have an on-board ballast water	3	L	A

	animals (such as Carpet sea squirt (*Didemnum vexillum*) larvae).				treatment system, if this is not possible then ballast water should be exchanged mid-ocean and not near the shoreline of the site**.**			
Anchorage	Anchors may be required for the mooring of vessels (dredgers and tugs) and if used, these pose the opportunity for bio-fouling and introduction of INNS to the site when lowered to the seabed.	3	L	A	Anchors for vessels used on site should be cleaned when the opportunity arises (e.g. at port or when refuelling) to minimise cross contamination between sites. It should be noted that the anchor (if used) will provide a relatively small opportunity for cross site contamination in comparison to other hazards listed in this risk assessment.	2	L	A
Bio-fouling of rock for groyne improvements	It is currently anticipated that existing revetment removed will be utilised for the groyne improvements. However, if rocks delivered on site have been reused from other projects or have spent prolonged periods of time in the marine environment, they may already be colonised with marine INNS which would then be introduced to the site.	4	M	AR	Any rock delivered to site should preferably be virgin material and not consist of rocks that has been sourced from other coastal defence schemes. Rocks should also be clean prior to introduction into the intertidal zone on site.	2	L	A
Bio-fouling (barge and tug used for beach recharge)	It is possible for the hulls of ships, barges and tugs used on site to be fouled by INNS such as algae, barnacles, and sea squirts. This presents an opportunity to introduce INNS to site and to other waters	4	M	AR	All vessels used on site should ensure they have a copy of their Bio-fouling Management Plan on board with clear information outlining efforts to reduce bio-fouling of the vessel, e.g. through anti-fouling treatments or use of biocides.	4	L	AR
Bio-fouling (materials removed)	Sections of the existing structures (such as rock revetment) will be required to be removed as part of the repair works. It is intended for the materials to be reused on the Scheme as far as it is possible. However, it is possible that if these sections of removed groyne are reused on other projects elsewhere, there could be a cross contamination of INNS from the Scheme area to other locations as the structures could be fouled.	3	M	AR	Once removed, (if not being utilised within the Scheme for the groyne improvements) the sections of rock revetment should be disposed of suitably on land and should not be disposed of or reused within the marine environment.	3	VL	A

Bio-fouling (previous origins of pipe)	Pipeline and associated equipment previously utilised on different sites have the potential to introduce non-native or non-localised species to site.	4	H	UA	The pipeline should be cleaned before first use and after final use for this project to prevent any cross-contamination. It should be noted that the pipeline will provide a relatively small opportunity for cross site contamination in comparison to other hazards listed in this risk assessment.	2	L	A
Dredged beach recharge materials	It is possible for INNS to be introduced/spread from the dredged material used for beach recharge.	4	M	AR	The dredged sand will be obtained only from a licenced dredging area and not from an area known to contain marine INNS. Additionally the dredged sand is coming from a subtidal site, meaning that any INNS contained are unlikely to survive transition into an intertidal area due to exposure at low tide.	2	L	A

outlines the potential hazards of the Scheme associated with the introduction, transfer and spread of INNS. This risk assessment should be included within the Construction Environmental Management Plan (CEMP). As outlined above, this risk assessment is precautionary as it relies upon records of INNS within and near to the site. The BSRA scoring methodology is presented in Appendix A.

Table 2-1: BSRA for the Scheme (risk is the transfer and introduction of INNS)

Hazard	Who or what might be affected?	Initial Assessment			Risk Control Measures	Residual Risk		
		Severity	Likelihood	Assessed Risk		Severity	Likelihood	Assessed Risk
Land Based Plant								
Use of land-based plant on the foreshore	Land-based plant will be used in the intertidal zone for the removal of sections of revetment, modification of outfalls, repairs and rock groyne improvements. This provides the opportunity for the spread of INNS across the intertidal area.	4	M	AR	Sections of the plant that would come into direct contact with the intertidal area (track/wheels) should be thoroughly cleaned before and after use to avoid the spread of any INNS (e.g. wheel washing facilities should be provided). This will also prevent potential spread from the Scheme's site area into other sites that may be used after the Scheme's construction is completed. If the risk is deemed to increase as a result of the discovery of INNS, the use of intertidal tracking matting should be considered. The number of vehicles	2	L	A

					used on site and the frequency at which they enter the intertidal area should be limited (vehicles should only enter the intertidal area on an ebb tide when there is a suitable dry area available for working).			
Machinery origins/ previous works	Machinery travelling or having previously worked on different sites has the potential to introduce non-native or non-localised species to site.	4	H	UA	A stringent system of vehicle maintenance and cleanliness should be implemented during construction works, including frequent vehicle washing between road and beach access. A CEMP should be adhered to and available on site and NRW Pollution Prevention Guidelines should be followed.	3	M	AR
Promenade works	Material used for improvement works to the promenade may introduce alien species or spread existing species and/or pathogens on site.	3	H	AR	Where possible, existing material should be reclaimed, therefore lowering the risk of the introduction of invasive species. Any brought in material should be bespoke. If this is not possible, it should be ensured that brought in material hasn't been utilised in the marine environment previously. Again, if this is not possible, material brought in should be screened for INNS ahead of its use on site.	2	L	A
PPE – contractor staff, operatives and sub-contractors	PPE can collect contaminants including mud, seeds, pathogens etc. which can easily be transferred to and between sites.	4	VH	UA	All PPE especially footwear, Velcro closures, gloves, etc. should be thoroughly inspected and cleaned before arrival on site. Boot washing as well as equipment cleaning facilities (with a biocide such as Virkon) should be provided and carried out when entering and exiting site. Ideally equipment should then be allowed to dry for 48 hours before it is used elsewhere (a different site). Transfer between work areas on site should be avoided and minimised where possible. Measures for biosecurity in the field are also further outlined in NNSS guidance[5].	3	M	AR

[5] GB non-native species secretariat, 2021. *Biosecurity in the field* [Online] Available at: http://www.nonnativespecies.org/index.cfm?pageid-=174

Use of brought-in green hay at Cayley embankment	In order to ensure a local seed mix is successfully used for ecological improvements at Cayley embankment, green hay will be cut and brought in from a donor site.	3	H	AR	Green hay should be sourced locally and be from a meadow or old grassland that has been screened for invasive plant species prior to spreading at Cayley embankment through survey/an assessment of survey data at the donor site.	2	L	A	
Marine Vessels/Plant									
Ballast Water	It is currently anticipated that a dredger and associated tug will be utilised for the beach recharge element. It may be necessary for these ships to take on board ballast waters from seas of different nations and to then dispose of these in UK waters (and vice versa). This could result in the spread of INNS in the form of marine microbes, plants and animals (such as Carpet sea squirt (*Didemnum vexillum*) larvae).	4	H	UA	All vessels and associated staff must ensure adherence to the Ballast Water Management Convention, 2017 for each vessel required for the works. This legislation outlines the requirements for each vessel to have a ballast water management plan, a ballast water record book and an international ballast water management certificate. Vessels should have an on-board ballast water treatment system, if this is not possible then ballast water should be exchanged mid-ocean and not near the shoreline of the site**.**	3	L	A	
Anchorage	Anchors may be required for the mooring of vessels (dredgers and tugs) and if used, these pose the opportunity for bio-fouling and introduction of INNS to the site when lowered to the seabed.	3	L	A	Anchors for vessels used on site should be cleaned when the opportunity arises (e.g. at port or when refuelling) to minimise cross contamination between sites. It should be noted that the anchor (if used) will provide a relatively small opportunity for cross site contamination in comparison to other hazards listed in this risk assessment.	2	L	A	
Bio-fouling of rock for groyne improvements	It is currently anticipated that existing revetment removed will be utilised for the groyne improvements. However, if rocks delivered on site have been reused from other projects or have spent prolonged periods of time in the marine environment, they may already be colonised with marine INNS which would then be introduced to the site.	4	M	AR	Any rock delivered to site should preferably be virgin material and not consist of rocks that has been sourced from other coastal defence schemes. Rocks should also be clean prior to introduction into the intertidal zone on site.	2	L	A	

Bio-fouling (barge and tug used for beach recharge)	It is possible for the hulls of ships, barges and tugs used on site to be fouled by INNS such as algae, barnacles, and sea squirts. This presents an opportunity to introduce INNS to site and to other waters	4	M	AR	All vessels used on site should ensure they have a copy of their Bio-fouling Management Plan on board with clear information outlining efforts to reduce bio-fouling of the vessel, e.g. through anti-fouling treatments or use of biocides.	4	L	AR
Bio-fouling (materials removed)	Sections of the existing structures (such as rock revetment) will be required to be removed as part of the repair works. It is intended for the materials to be reused on the Scheme as far as it is possible. However, it is possible that if these sections of removed groyne are reused on other projects elsewhere, there could be a cross contamination of INNS from the Scheme area to other locations as the structures could be fouled.	3	M	AR	Once removed, (if not being utilised within the Scheme for the groyne improvements) the sections of rock revetment should be disposed of suitably on land and should not be disposed of or reused within the marine environment.	3	VL	A
Bio-fouling (previous origins of pipe)	Pipeline and associated equipment previously utilised on different sites have the potential to introduce non-native or non-localised species to site.	4	H	UA	The pipeline should be cleaned before first use and after final use for this project to prevent any cross-contamination. It should be noted that the pipeline will provide a relatively small opportunity for cross site contamination in comparison to other hazards listed in this risk assessment.	2	L	A
Dredged beach recharge materials	It is possible for INNS to be introduced/spread from the dredged material used for beach recharge.	4	M	AR	The dredged sand will be obtained only from a licenced dredging area and not from an area known to contain marine INNS. Additionally the dredged sand is coming from a subtidal site, meaning that any INNS contained are unlikely to survive transition into an intertidal area due to exposure at low tide.	2	L	A

See Appendix A for severity, likelihood and risk assessment descriptors scoring methodology.

A. Bio-security Risk Assessment Scoring Matrix

Table A.1: Bio-Security Risk Assessment Scoring Matrix

Biosecurity Severity or Consequence

1 = Slight – no measurable consequence
2 = Minor – slight impact, small scale, easily contained
3 = Moderate – damage recoverable, moderate impact
4 = Permanent – considerable damage, long term impacts no native flora and/or fauna
5 = Catastrophic – major damage, threat to species
Likelihood
VL = Improbable – unlikely to occur
L = Remote – unlikely but possible
M = Occasional – possible at some time
H = Probable – likely to occur several times
VH = Frequent – likely to occur many times
Acceptability of Assessed Risks
N = Negligible
A = Acceptable (manage risk)
AR = Action required (if reasonably practical)
UA = Unacceptable (action essential)
Assessed Risk

		Severity				
Likelihood		**1**	**2**	**3**	**4**	**5**
	VL	N	N	A	A	A
	L	N	A	A	AR	AR
	M	A	A	AR	AR	UA
	H	A	AR	AR	UA	UA
	VH	A	AR	UA	UA	UA

Source: Mott MacDonald Ltd, 2015

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Appendix 9.10 – Underwater Noise Assessment

Technical Note

Project:	Colwyn Bay Waterfront Project Phase 2b		
Our reference:	100-374-MMD-00-XX-RP-N-0037		
Prepared by:	Stuart Dyne	**Date:**	16 August 2021
Approved by:	N. Haines	**Checked by:**	D. Jones
Subject:	Underwater Noise Assessment		

1 Introduction

Mott MacDonald Ltd has been commissioned by Conwy County Borough Council (CCBC) to complete a series of technical assessments in support of an Environmental Impact Assessment (EIA) relating to the Colwyn Bay Waterfront Project Phase 2b Scheme.

One construction activity planned for the project would be the placement of sand on the Colwyn Bay beach to raise existing beach levels. The sand would be collected from a licenced dredging area off-shore in the Liverpool Bay and deposited on the beach via a floater and sinker pipeline (constructed initially on Pensarn Beach before being towed round the coast). During the beach recharge activity, support vessels would be in place to assist the dredge vessel whilst sand is pumped along the pipe to the beach, and a tracked excavator would move the deposited sand around the beach to ensure the design profiles are achieved.

Construction activity within, and close to, water produces underwater noise that may affect fish and marine mammals (DEFRA, 2003; Thomsen, et al., 2006). After discussion with Natural Resources Wales (NRW) an assessment of the potential underwater noise from the beach recharge activities related to the dredger vessel and tracked excavator has been carried out, the results of which are presented in this technical note.

This assessment considers the following:

- The construction activity that may produce underwater noise;
- The sensitivity of identified marine receptors;
- The distance from the construction activity at which various effect levels arise; and
- Mitigation to control the adverse effects.

The study is based upon construction information available at the time of the assessment which has been augmented with assumptions where the information is incomplete:

- Peer-reviewed literature on the sensitivity of marine receptors, and guidance on assessment criteria for them (particularly Popper et al. 2014 for fish and NMFS, 2018 for marine mammals);
- Estimates of the source levels based on the literature supplemented with underwater measurements of construction activity including piling made by Mott MacDonald at another location in the UK (Department of Energy and Climate Change (DECC), 2011; Mott MacDonald, 2018); and
- Use of simple models for geometric spreading and acoustic absorption of underwater sound.

2 Construction activity

Colwyn Bay construction works that could involve the generation of underwater noise include dredging and land-based activity involving use of an excavator or similar plant. No piling is expected as part of the Scheme and therefore note included as part of this assessment.

3 Underwater Noise Impact Criteria

3.1 Introduction

Fish and marine mammals can detect underwater sound either through the mechanism of a sound pressure wave, particle motion/velocity or a combination of both (Nedelec, et al., 2016; Popper & Hawkins, 2019). Species vary in their sensitivity to underwater noise and the range over which they can detect the sound, and over which they respond to it (National Marine Fisheries Service, 2018; Popper, et al., 2014).

One of the predominant factors that influences noise impact for fish in particular is the presence or absence of a gas bladder (also referred to as a swim bladder) in the body, its anatomical location within the fish and whether it is connected to the hearing organs known as otoliths[1] (Popper, et al., 2014). Those fish species without a gas bladder are commonly thought to be able to detect only particle motion, whilst those with a gas bladder are able to detect sound pressure to varying degrees based on the connectivity of the gas bladder with the otoliths. While the presence of a gas bladder can increase acoustic sensitivity, via transmission of sound energy to the otolithic organs if they are connected, it also increases the susceptibility of fish to injury from underwater noise (Popper & Hawkins, 2019).

Marine mammals have been classified into hearing groups that depend on their generalised hearing range (National Marine Fisheries Service, 2018). These groups are low, mid and high frequency cetaceans (which include whales, dolphins and porpoises) and Phocidae and Otariidae pinnipeds (which include seals and sea lions).

The ears of sea turtles appear to be adapted to detect sound in water with retention of air in the middle ear an indication that they are able to detect sound pressure (Popper, et al., 2014).

Table 1: Categorisation of acoustic dependent species in Welsh waters[2]

Categories	Example species
Fish: No swim bladder (Particle motion detection)	Flatfish e.g. plaice (*Pleuronectys platessa*), flounder (*Platicthys flessus*)
Fish: Swim bladder is not involved in hearing (particle motion detection)	Atlantic salmon (*Salmo salar*), sea trout (*Salmo trutta*)
Fish: Swim bladder involved in hearing (primarily pressure detection)	Herring (*Clupea harengus*), Atlantic cod (*Gadus morhua*), European sprat (*Sprattus sprattus*)
Reptiles	Sea turtles
Low frequency (LF) cetaceans (Baleen whales) 7 Hertz (Hz) to 35kHz	Minke Whale (*Balaenoptera acutorostrata*)
Mid frequency (MF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose dolphins) 150Hz to 160kHz	Bottlenose dolphin (*Tursiops truncatus*)
High frequency (HF) cetaceans (e.g. true porpoises, 275Hz to 160kHz	Harbour porpoise (*Phocoena phocoena*)

[1] Otoliths are structures located in the inner ear cavity of all teleost fish and serve as a balance organ and also aid in hearing.

[2] Several of these species occasional visitors to Welsh waters rather than part of resident populations

Categories	Example species
Phocid pinnipeds (PW) (true seals)	Grey seal (*Halichoerus grypus*); Harbour seal (*Phoca vitulina*)

Source: Popper et al, (2014), NMFS,(2018)

Although fish have been grouped by the influence of a gas bladder on hearing, the species within a group may have differing sensitivities to underwater noise (Popper & Hawkins, 2019). For example, herring have specialised hearing apparatus linking the auditory system to the swimbladder increasing their hearing range. Such apparatus is absent in gadiformes (cod, haddock) and European eels, however, it is noted that the swimbladder still plays some role in hearing for these species. The groupings described in Table 1 have informed hearing thresholds for relevant species within this assessment.

3.2 Units to describe exposure

Acoustic pressure is the scalar variation in underwater pressure about a mean value and has units of Pa but is conventionally converted to a decibel scale with a reference value p_0 of 1 x 10^{-6} (1μPa). That is, a pressure variation p becomes a pressure level L using the formula $L = 20 \log \left(\frac{p}{p_0}\right)$. Particle velocity is a vector quantity (having both value and direction) and has units m/s or mm/s. Velocity is one of several entities that can be used to express particle motion (as displacement, velocity, or acceleration) but these are all directly related to each other through differential calculus. Away from the surface, river-bed and acoustic sources, the acoustic pressure and particle velocity are directly proportional to each other. Moreover, as there is currently a paucity of data on the sensitivity of fish or mammals to particle motion (Nedelec, et al., 2016), all criteria in this assessment are expressed in terms acoustic pressure and not particle motion, although it is recognised that some species are sensitive to particle velocity in particular (Popper & Hawkins, 2018).

Acoustic pressure varies continuously with time so no single-number entity can be used to fully describe noise. Statistical quantities are therefore often used to describe sources such as dredging noise. These include the root-mean-square (rms) pressure which can also be converted to a decibel quantity L_{rms} also with reference unit of 1μPa.

Criteria for the effect of sound on fish are expressed in terms of unweighted sound pressure. However, some of the criteria for the effect of sound on mammals are expressed in terms of weighted sound pressure, notably the sound exposure level (SEL) for exposure over 24 hours $L_{E,24h}$ where the weighting reflects the relatively low sensitivity to noise at very low and very high frequencies. In these cases, a frequency weighting network (loosely analogous to an audio graphic equaliser with pre-set frequency dependent gain) is applied before the conversion to decibels is made. This is similar to the A-weighting that is applied to determine the effect of sound on people in air. The SEL (weighted or otherwise) is expressed in dB with a reference unit of 1μPa^2s.

3.3 Effects of sound exposure

At the lowest noise levels there is no known effect on fish or marine mammals. As noise levels increase the effect ranges from changes in behaviour, temporary threshold shift in hearing (TTS), permanent threshold shift in hearing (PTS), barotrauma injury and death (Erbe, 2012; Faulkner, et al., 2018; Thomsen, et al., 2006).

Potential effects on behaviour include impacts on ability to communicate, detection of predators and prey and may be on both the individual or population level (Faulkner, et al., 2018; Simpson, et al., 2015). In response to anthropogenic sound fish have been observed to change swimming behaviour and show a startle reaction, although under repeated exposure to similar sounds habituation has also been observed (Neo, et al., 2018).

Hearing loss may be temporary, producing a TTS, or permanent producing a PTS. These threshold shifts are increases in the threshold of audibility of sound which is the minimum sound pressure level of a sound able to evoke an auditory sensation. A TTS is a reversible shift resulting from a temporary change in sensory hair cells or damage to the auditory nerves. Sensory hair cells are renewed in fish so are replaced when damaged, whereas this is not the case for mammals (Erbe, 2012; Popper, et al., 2014). In all TTS cases normal hearing is eventually restored when exposure to high amplitude noise ceases although there may have been temporary behavioural effects caused by reduced hearing fidelity while hearing sensitivity was reduced. However, in PTS cases normal hearing is not restored and the reduced hearing fidelity may impact the ability to communicate and ability to detect predators and prey (Faulkner, et al., 2018).

Barotrauma is a result of rapid pressure changes that produce tissue injury. The pressure changes can cause blood gases to come out of solution or produce rapid changes in gas volumes damaging surrounding tissue The effects can lead to lethal injury or delayed mortality depending on the severity of the pressure change and the sensitivity of the animal (Halvorsen, et al., 2012). In some cases, although not directly producing lethal injury itself the barotrauma effect can be to decrease in fitness, leaving the animal vulnerable to predation or disease (Caspar, et al., 2012).

3.4 Noise impact criteria

Criteria for effect thresholds for underwater noise are presented in sound exposure guidance (Popper et al., 2014 and NOAA, 2018) for fish and mammals respectively although for continuous sounds for fish these are predominantly qualitative. These criteria are reproduced in Table 2. Relative risk is given for animals at three distances from the source defined in relative terms as near (N) – typically tens of metres, intermediate (I) – typically hundreds of metres and far (F) – typically thousands of metres. The rms sound pressure levels are given in dB re 1μPa. It will be noted that the quantitative criteria are specified for periods of 48 hours and 12 hours. This does not mean that the animal needs to be exposed to the noise source for these periods, rather this is the averaging time for the exposure and there is a trade-off between exposure level and duration whereby a halving of exposure duration is approximately equivalent to a 3dB change in level. That is 170 dB for 48 hours is equivalent to 173 dB for 24 hours, 176 dB for 12 hours, 179 dB for 6 hours etc.

Table 2: Shipping and continuous sound effect criteria for fish

Animal type	Mortality and potential mortal injury	Recoverable injury	TTS	Masking	Behaviour
Fish: no swim bladder (particle motion detection)	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) High (I) High (F) Moderate	(N) Moderate (I) Moderate (F) Low
Fish: swim bladder is not involved in hearing (particle motion detection)	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) High (I) High (F) Moderate	(N) Moderate (I) Moderate (F) Low
Fish: swim bladder is involved in hearing (particle motion detection)	(N) Low (I) Low (F) Low	170 dB rms for 48h	158 dB rms for 12h	(N) High (I) High (F) High	(N) High (I) Moderate (F) Low
Sea turtles	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) High (I) Moderate (F) Low	(N) Moderate (I) Moderate (F) Low

Source: Popper et al., 2014

While criteria for mammals are given in technical guidance (National Marine Fisheries Service, 2018) for TTS and PTS, there are no criteria for behaviour changes or mortality. However, it would be expected that the onset of behaviour changes would arise at only levels that are lower than the onset of TTS and that mortality and potential mortal injury would arise only at levels that are higher than the onset of PTS. For non-impulsive

sound (such as dredging) the threshold is given only as the weighted sound exposure level over 24 hours (see Table 3).

Table 3: Effect criteria (onset thresholds) for mammals for non-impulsive sounds, dB re 1μPa^{2}s for L_E

Hearing group	PTS for non-impulsive sound	TTS for non-impulsive sound
Low frequency (LF) cetaceans (7Hz to 35kHz)	$L_{E,LF}$ 199 dB	$L_{E,LF}$ 179 dB
Mid frequency (MF) cetaceans (150Hz to 160kHz)	$L_{E,MF}$ 198 dB	$L_{E,MF}$ 178 dB
High frequency (HF) cetaceans 275Hz to 160kHz	$L_{E,HF}$ 173 dB	$L_{E,HF}$ 153 dB
Phocid pinnipeds (PW)	$L_{E,PW}$ 201 dB	$L_{E,PW}$ 181 dB

Source: NMFS, 2018

The weighting functions for the PTS/TTS thresholds were derived by the NOAA(National Marine Fisheries Service, 2018) from available data describing the hearing abilities and effects of noise on marine mammals. They are characterised by a generic band-pass filter with frequency f given by the formula

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a[1+(f/f_2)^2]^b}\right\}$$

where the values of the coefficients are given in Table 4.

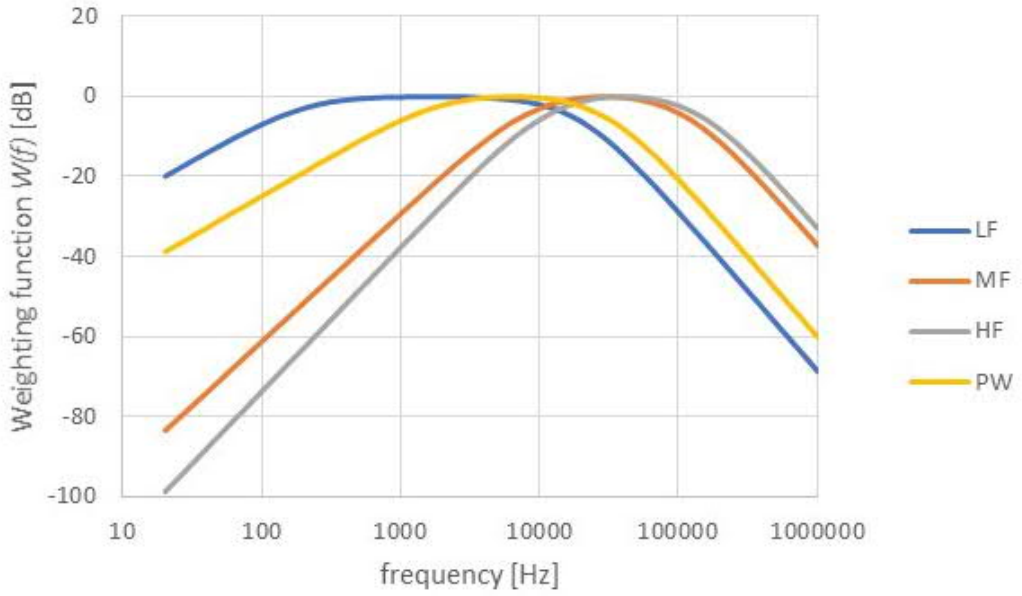
Table 4: Coefficient values for mammal weighting functions

Hearing group	a	b	f_1 [kHz]	f_2 [kHz]	C [dB]
Low frequency (LF) cetaceans	1.0	2.0	0.2	19	0.13
Mid frequency (MF) cetaceans	1.6	2.0	8.8	110	1.20
High frequency (HF) cetaceans	1.8	2.0	12	140	1.36
Phocid pinnipeds (PW)	1.0	2.0	1.9	30	0.75

Source: (National Marine Fisheries Service, 2018)

The shape of these weighting functions given below shows how each weighting function attenuates low frequency and high frequency components but that the pass-band (where the filter gain is 0dB, i.e. unity gain) differs for each hearing group (see Figure 1).

Figure 1: Gain W(f) of the mammal hearing groups



3.5 Value of receptors

The criteria used in this assessment solely assess the risk of injury to underwater species based on the temporary or permanent shifts in hearing threshold. The value of the receptors in terms of scarcity, distinctiveness, ecological role or protected status is reviewed in the main ES chapter using the results of this assessment.

4 Construction Noise

4.1 Transmission loss

Conventionally underwater noise levels are expressed as the transmission loss (TL) subtracted from the source level (SL). The SL is the level that would be obtained at 1m from the (conceptual) acoustic centre of the source and the TL is the transmission loss associated with the reduction in noise level from the nominal 1m to the measurement or prediction location (Robinson, et al., 2014). The TL model is potentially very complex with dependency on many factors such as water depth, bottom type, surface roughness, water temperature (and particularly variation as a function of depth), salinity etc. All of these factors are potentially also frequency dependent. However, some very simple models exist that are useful for estimation purposes. The model used in the Green Port Hull assessment (ABPmer, 2011; Moxley, 2015) is $TL=\beta\log(r)+\alpha r$ where the coefficient of the log term, β, is given as 17.91 (with a standard deviation of 3.05) and the α term is 0.00523 dB/m (with a standard deviation of .00377 dB/m). These figures are based on a compilation of 11 and 9 observations made respectively by the Environment Agency. The β term corresponds to attenuation by spreading – it would be 20 for purely spherical spreading and 10 for cylindrical spreading. The α term corresponds to absorption and is only important when large distances or high frequencies are involved (saltwater absorption is frequency dependent) (Robinson, et al., 2014).

A simple approach for the spreading loss with a value of $\beta = 15$ has been used for assessments in UK waters (NorthConnect, 2018) that is a hybrid between the cylindrical model and spherical spreading model and is consistent with the model proposed by Marsh and Schulkin (1962), cited in Duncan and Parsons (2011).

Duncan and Parsons (2011) show the calculated transmission loss estimates for a 50m deep isothermal water column with a flat basalt sea bed is approximately 60dB from 1m to 10km, i.e. an *average* of 15dB per decade increase in distance, but that this is not steady and is greater closer to the source than at larger distances. A further example is provided by Andersson (2017) who shows a sound exposure level attenuation from approximately 189dB at 0.3km to 156dB at 20km. This is equivalent to a β value of 18. For this assessment a value of $\beta = 18$ is used as details of the acoustic absorption properties of this part of the north Wales coast are not known and this value is consistent with the Environment Agency observations discussed above when rounded to two significant figures. A consideration of the impact of uncertainties is provided in Section 6.

4.2 Source level

The source level (SL) is predominantly a function of the type of plant used in construction that generates the underwater sound. Mott MacDonald underwater measurements of land-based dredging including bucket scraping and cutting typically produced an unweighted underwater noise level L_{rms} of 123dB at 26m from the dredging activity (Mott MacDonald, 2018).

In addition, dredging noise is reported in the DECC review (2011) as set out in the table below.

Table 5: Underwater noise data for dredging

Dredger type	Reported L_{rms} [dB re 1µPa]	Distance [m]	Distance correction to 750m [dB]	Estimate L_{rms} at 750m [dB re 1µPa]
CSD Beaver Mackenzie	133	190	11	122
CSD Aquariu	140	200	10	130
TSHD Cornelis Zanen	142	930	-2	144
TSHD Geopotes X	139	430	4	135
TSHD W.D. Gateway	131	1500	-5	136
Grab Viking	124	150	13	111
TSHD The City of Westminster	144	150	13	131
Mott MacDonald bankside measurement	123	200	10	113

Source: DECC (2011) and Mott MacDonald, 2018

The table shows a fairly wide variation in dredging noise levels at 750m with all values no more than 144dB L_{rms} at 750m. Moreover, the peak in the noise spectrum of dredging noise is at a relatively low frequency (typical 100Hz to 200Hz) where the mammal weighting curves produce further species-dependent attenuation. The table below shows conservative levels for dredging noise for all hearing groups at 10m (assuming animals would not attempt to get closer to dredging activity than this) for dredging at sea assuming the noise would be 144dB L_{rms} at 750m at 200Hz. The table also shows the noise level due to land-based dredging assuming the unweighted noise would be 123dB L_{rms} at 23m

Table 6: Dredging noise levels (used as a proxy for debris removal, drilling, probing and ground anchor installation)

Hearing group	200Hz attenuation [dB]	L_{rms} at 10m [dB re 1µPa] for dredging at sea	L_{rms} at 23m [dB re 1µPa] for land-based dredging
Fish (all types)	0	178	123
Low frequency (LF) cetaceans	3	175	120

Hearing group	200Hz attenuation [dB]	L_{rms} at 10m [dB re 1µPa] for dredging at sea	L_{rms} at 23m [dB re 1µPa] for land-based dredging
Mid frequency (MF) cetaceans	51	127	72
High frequency (HF) cetaceans	63	115	60
Phocid pinnipeds (PW)	19	159	104

Source: Mott MacDonald

5 Modelling results

The noise level estimates set out above, together with the propagation attenuation and frequency-dependent weighting curves may be used to determine the distances at which PTS and TTS are predicted to arise. These values are set out below. The assumed frequency-weighted L_{rms} underwater noise level normalised to 10m for dredging were given in Table 6. These have been used together with the PTS/injury and TTS criteria for steady noise to estimate the distances at which these effects will arise for 6 hours of beach recharge activity over 24 hours[3].

Table 7: Effect criteria (onset thresholds) for fish and mammals, dB re 1µPa for L_{rms} and dB re 1µPa^{2}s for $L_{E,HF}$ and distances where these are expected to arise for dredging* at sea

Hearing group	Weighting	PTS/injury for continuous sound	Distance at which PTS/injury arises	TTS for continuous sound	Distance at which TTS arises
Fish: no swim bladder (particle motion detection)	None	(N) Low (I) Low (F) Low	Low risk all distances	(N) Moderate (I) Low (F) Low	Moderate risk at tens of metres, otherwise low
Fish: swim bladder is not involved in hearing (particle motion detection)	None	(N) Low (I) Low (F) Low	Low risk all distances	(N) Moderate (I) Low (F) Low	Moderate risk at tens of metres, otherwise low
Fish: swim bladder is involved in hearing (particle motion detection)	None	170 dB rms for 48h (equivalent to 173 dB rms for 24h)	8 m	158 dB rms for 12h (equivalent to 161 dB rms for 24h)	116 m
Low frequency cetaceans	LF	$L_{E,LF}$ 199 dB	115 m	$L_{E,LF}$ 179 dB	1490 m
Mid frequency cetaceans	MF	$L_{E,MF}$ 198 dB	< 1 m	$L_{E,MF}$ 178 dB	3 m
High frequency cetaceans	HF	$L_{E,HF}$ 173 dB	2 m	$L_{E,HF}$ 153 dB	20 m
Phocid pinnipeds	PW	$L_{E,PW}$ 201 dB	12 m	$L_{E,PW}$ 181 dB	149 m

[3] Dredging sound has been used as a proxy for the sound of sand being pumped to shore due to a lack of data on source levels for the latter. This provide a conservative estimate of effect as dredging sound is considered slightly louder than pumping activity,

*used as a proxy for beach recharge sound via a pipe and pump system

Table 7 shows that the risk of PTS or injury from underwater noise from six hours of dredging[3] at sea for all fish types is low except for fish where the swim bladder involved in hearing. For those with a swim bladder involved in hearing there closer than 8m to the beach recharge activity for more than 6 hours there is a risk of PTS or injury.

With regards to TTS, for those fish without a swim bladder involved in hearing, or no swim bladder, there is a is a moderate risk of TTS at tens of metres. For those fish where the swim bladder is involved in hearing the distance at which there is a risk TTS occurring if present for 6 hours is within 116m from the beach recharge activity.

For cetaceans the risk of harm is low: they would need stay within 115m of dredging for PTS to arise or within 1490m for a TTS to arise but healthy animals would likely swim away if disturbed by the beach recharge activity noise. For pinnipeds the risk of harm is also low: they would need stay within 12m of dredging for PTS to arise or within 149m for a TTS to arise but healthy animals would likely swim away if disturbed by dredging noise.

The assumed frequency-weighted L_{rms} underwater noise level at 23m from land-based dredging were given in Table 6. These have been used together with the PTS/injury and TTS criteria for steady noise to estimate the distances at which these effects will arise for 6 hours of dredging activity over 24 hours.[4]

Table 8: Effect criteria (onset thresholds) for fish and mammals, dB re 1µPa for L_{rms} and dB re 1µPa^{2}s for $L_{E,HF}$ and distances where these are expected to arise for land based dredging

Hearing group	Weighting	PTS/injury for continuous sound	Distance at which PTS/injury arises	TTS for continuous sound	Distance at which TTS arises
Fish: no swim bladder (particle motion detection)	None	(N) Low (I) Low (F) Low	Low risk all distances	(N) Moderate (I) Low (F) Low	Moderate risk at tens of metres, otherwise low
Fish: swim bladder is not involved in hearing (particle motion detection)	None	(N) Low (I) Low (F) Low	Low risk all distances	(N) Moderate (I) Low (F) Low	Moderate risk at tens of metres, otherwise low
Fish: swim bladder is involved in hearing (particle motion detection)	None	170 dB rms for 48h (equivalent to 173 dB rms for 24h)	<1 m	158 dB rms for 12h (equivalent to 161 dB rms for 24h)	<1 m
Low frequency cetaceans	LF	$L_{E,LF}$ 199 dB	< 1 m	$L_{E,LF}$ 179 dB	4 m
Mid frequency cetaceans	MF	$L_{E,MF}$ 198 dB	< 1 m	$L_{E,MF}$ 178 dB	< 1 m
High frequency cetaceans	HF	$L_{E,HF}$ 173 dB	< 1 m	$L_{E,HF}$ 153 dB	< 1 m
Phocid pinnipeds	PW	$L_{E,PW}$ 201 dB	< 1 m	$L_{E,PW}$ 181 dB	< 1 m

[4] Please note that land-based dredging is assumed to be the movement of sand across the beach after deposition via the pipe from the dredge vessel. This is unlikely to be carried out underwater or will be in shallow water. Therefore, any estimates of transmission and potential effects here are conservative.

Table 8 shows that the risk of harm from underwater noise from six hours of land based dredging for all fish types and mammals is low, except for fish without a swim bladder or where the swim bladder is not involved in hearing where there is a moderate risk at tens of metres. For cetaceans the risk of harm is low: they would need stay within 4m for the 6 hours for a TTS to arise. For pinnipeds the risk of harm is also low.

6 Uncertainty

Several assumptions were made in the determination of the potential impact of underwater construction noise on the animals set out in Table 1, above. In the section that follows the impact of departures from these assumptions is considered in terms of its potential to change the assessment outcome.

- *Sensitivity of the animals.* The criteria at which effects arise are taken directly form peer-reviewed literature and there is low risk that these could be incorrect. There is therefore low risk of change to the assessment outcome associated with this factor;
- *Simple geometric spreading model*. This is a simplification of the complex geometry and acoustical attenuation properties of the north Wales coast. A spreading loss model with β=18 has been used in lieu of more detailed modelling that would require knowledge of the lithology and acoustic absorption of the area. There is a moderate risk of change to assessment outcome associated with this factor;
- *Seawater absorption model*. This is unlikely to affect outcomes, as it is only important at larger distances; and
- *Source levels*. These have been used as reported in the literature or as measured by Mott MacDonald. Although no single value is relied upon in the assessment there is a risk of change in assessment outcome if these values are increased significantly.

7 Conclusion

The assessment presented Section 5 demonstrates that underwater noise from dredging and associated operations presents a low risk of injury to either fish or mammals. No mitigation is proposed to control the risks associated with underwater noise.

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