

4 Scheme Construction

4.1 Assumptions

- 4.1.1 The information in this chapter has been collated through discussions with the Applicant, examining information from previous Phases of the Colwyn Bay Waterfront Project and some limited Early Contractor Engagement. The below is a preliminary, outline methodology based on current best understanding and is subject to amendment, consent and construction stage contractor methodology and risk assessments.

Programme

- 4.1.2 CCBC will need to obtain final funding approval from Welsh Government for these works. The CRMP (see Section 1.3) requires construction to commence by 31st March 2022. Therefore, the following programme assumptions have been made for ES purposes:

- Detailed design of the Scheme would be complete by Summer 2021;
- All financial approval, consents including a marine licence would be available to enable a start by end March 2022;
- The Scheme would be constructed in one continuous period of construction (although there may be several sub-phases); and
- The construction period would last for approximately 14 months.

- 4.1.3 It is currently anticipated that the construction activities would be completed in the following order:

1. Repairs to seawall, modifications to terminal rock groyne and extension of outfalls;
2. Beach recharge; and
3. Promenade works.

- 4.1.4 However this may be subject to change depending on the specific contractor methodology utilised and some work could be undertaken simultaneously.

Miscellaneous

- 4.1.5 Other assumptions include:

- All design would be complete prior to construction commencement;
- All land would be acquired/leases negotiated and available for permanent works and compound areas; and
- Major utilities would be diverted/relocated where required.

4.2 Key dates and construction phasing

Key dates

- 4.2.1 Table 4.1: shows the summary of anticipated key dates on the outline construction programme (subject to the assumptions in Sections 4.1.2 to 4.1.5).

Table 4.1: Milestones

Milestone	Key date
Stage 1: Pre-qualification	October 2021

Milestone	Key date
Stage 2: Restricted tender	January 2022 (or three months from Stage 1)
Award and access date	March 2022 (or two months from Stage 2)
Construction completion	May 2023 (or 14 months from award and access date)

Source: CCBC, 2021

Construction phasing

4.2.2 The Project has been divided into two general sections for the purposes of planning and sequencing the works as follows:

- Coastal: Seawall, intertidal and marine works; and
- Promenade: Promenade improvements and highways works.

4.2.3 It has been assumed that the start date for the main works package would be March 2022, commencing with a short period of mobilisation and development of the health and safety plan and other relevant documents.

Coastal works

4.2.4 A six month construction period is anticipated, commencing April 2022 and finishing in September 2022.

Promenade works

4.2.5 A 14 month construction period is anticipated, commencing as early as end March 2022 and extending to May 2023 (it is anticipated that works undertaken in April-May 2023 would primarily comprise snagging activities).

4.3 Construction details of works to be completed

Seawall repairs, terminal groyne works and outfall extensions

4.3.1 This work is all proposed to be completed prior to beach recharge at lower tidal states using land-based tracked plant. Access to the foreshore would be gained using existing slipways with no additional temporary accesses required.

Seawall repairs

4.3.2 The proposed repairs of the seawall including grouting, re-pointing, replacement of coping ties etc is anticipated to be completed using hand tools.

Terminal groyne works

4.3.3 The existing rock groyne at Rhôs-on-Sea Harbour comprises approximately 2,000m³ of nominal 1.0t rock armour. The modified groyne would require approximately 10,000m³ of rock armour. This material would be recycled from the three existing groynes and from the existing toe protection along the base of the seawall (see Figure 3.1 in Chapter 3 Scheme Description).

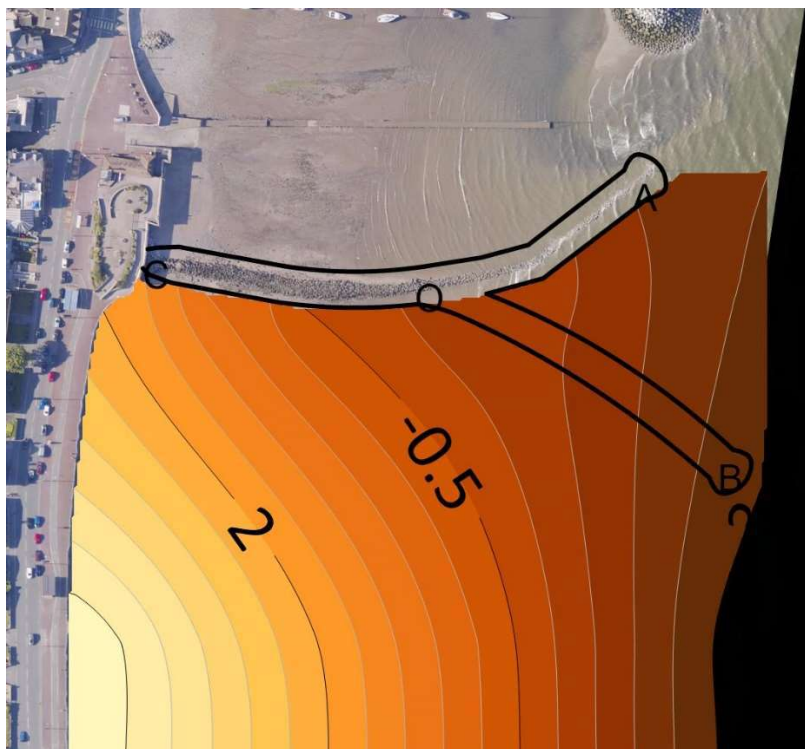
4.3.4 This recycled rock armour would be stockpiled adjacent to the terminal groyne close to where it is to be placed for immediate re-use to minimise handling and stockpile time.

4.3.5 The following construction methodology would be adopted for construction of the groyne:

- Groyne construction would be completed before beach recharge commences;
- The existing groyne would be removed and reconstructed sequentially as follows (see Figure 4.1):

- New length OB constructed;
- Existing length OA removed and re-constructed; and
- Existing length OC removed and re-constructed.
- All existing rock in a section would be removed and temporarily stockpiled;
- The existing rock would be mixed with other recycled rock from within the Scheme area to achieve the required grading;
- Access across the foreshore for plant and equipment to be limited to the footprint of the new structure and an approximate 10m corridor either side;
- Beach sand at the toe would be excavated and placed to the south of the groyne within areas to be recharged;
- Geotextile layer to be placed in widths crossways across the base of the structure; and
- Rock to be placed to required footprint and level.

Figure 4.1: Proposed groyne layout and recharged beach contours



Source: Coastal Engineering UK, 2021.

- 4.3.6 Works would be anticipated to take approximately 6-8 weeks of low tide working using land based plant – considered likely to include a large 360° tracked excavator with grab attachment and a large rear loader dumper.

Outfall extension works

- 4.3.7 Extensions to three outfalls within the Phase 2b area is proposed. The extensions would involve a concrete bedded and surrounded pipe extension across the intertidal area for 150-200m depending on the specific location.
- 4.3.8 The methodology is yet to be confirmed but would be considered likely to include construction of the chamber first, next to the existing sea wall. For this, the base slab would be constructed followed by the walls (either cast in situ using formwork or pre-cast chamber rings). The pipe

and concrete protection would then be constructed sequentially working from the seawall northwards. The structure and pipe would be laid in sections, with regular expansion joints. The extended outfall would progress down the beach, adding section after section until the required length has been reached.

4.3.9 The work would be completed using land based plant (likely to comprise a 360° tracked excavator, concrete pump, dump truck and potentially a crane) at lower tidal states.

4.3.10 The outfall would remain operational throughout the works, and to maintain service level this may require over-pumping from the sea wall into the sea during construction.

Beach recharge works

4.3.11 Following the completion of the seawall repairs, groyne modification works and outfall extensions, the beach recharge works would commence.

4.3.12 The beach recharge works would be as described within Section 3.2.

4.3.13 The sea dredged sand would be d50 sand grain mix, between 0.2mm and 0.4mm, obtained from existing offshore licensed dredging areas and transported to the site by sea and placed to profile on the beach. Sand from the previous phases came from Area 457 owned by Westminster Gravels (see Figure 4.2). This area is located approximately 40km north north-east by sea and the grading of material obtained from this site meets acceptable recharge grading envelope. It is considered desirable (although not certain) that sand would again be imported from this area, for consistency with the previous phases.

Figure 4.2: Location of Area 457



Source: Work Method Statement, Colwyn Bay Coastal Defence Phase 1b, March 2013

4.3.14 The proposed method of recharge is likely to be the same as utilised for previous phases and be via pipeline delivery:

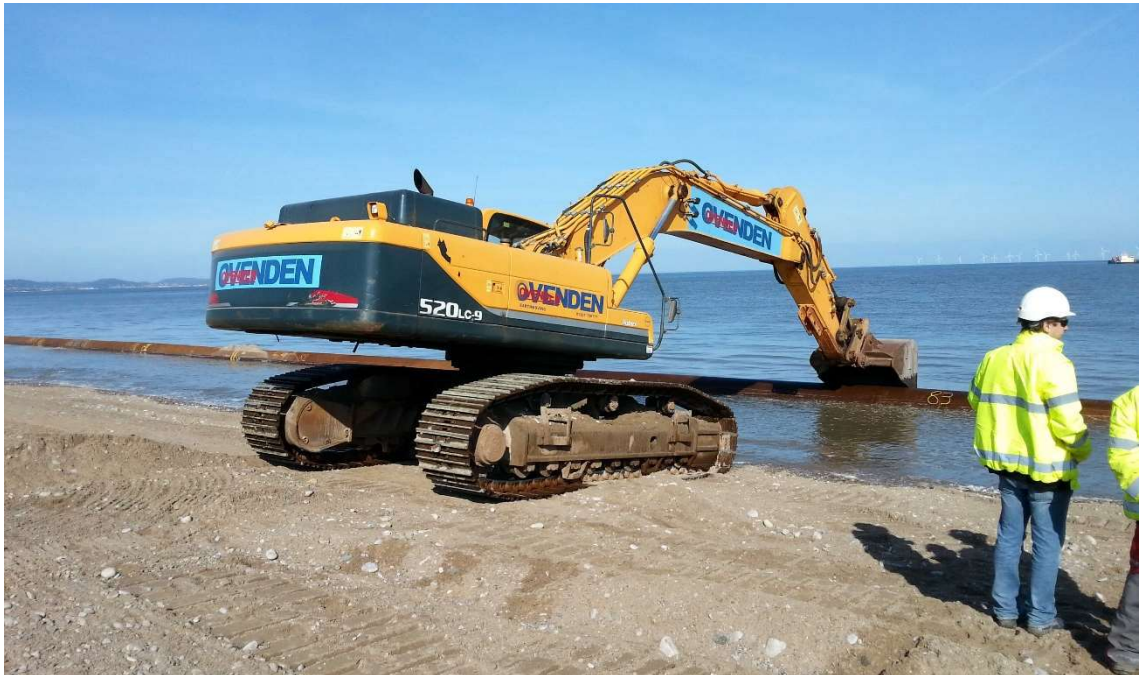
- Material would be dredged from the seabed and transported to Colwyn Bay in a medium sized Trailing Suction Hopper Dredger (TSHD) (a sea-going self-propelled ship equipped with one or two suction pipes, designed to hang along the side of the vessel. A draghead is fixed at the lower end of the suction pipe, which is then trailed along the bottom of the

seabed. Suction is provided by a pump, which lifts the sand off the seabed and discharges the mixture of sand and water into the hopper well);

- A floating and sinker pipeline (~1600m to 1800m in length, of which ~200m is anticipated to be the floating pipeline closest to the dredger) would be assembled above MHWST at the nearby beach (Traeth Pensarn) to the east (used for the previous phases, see Photo 4.1 and Drawing 100374-MMD-00-XX-DR-N-0020 in Chapter 1 Introduction, Section 1.9) and transported to site by sea. It is considered likely that the first length of pipeline would be launched over high tide and positioned at the end of the second length, welded during low tide and then the full length of pipeline launched over the subsequent high tide. The TSHD would connect to the pipeline and pump the material (which is first fluidised with sea water) ashore (see Photo 4.2); and
- Land based plant (likely to comprise 360° tracked excavators, bulldozers and dumpers) would spread the material into the required beach profile and prepare the area for the next discharge operation by moving the shore section of pipeline to the required location (see Photo 4.3 and Photo 4.4).

- 4.3.15 The delivery and placement of sand would be a 24-hour operation anticipated to take around 8 weeks if using a large TSHD. There is the potential to use smaller TSHDs which may have some benefits including pumping at all tidal states, fewer potential delays, shorter pipeline lengths and better vessel availability. However, would likely increase the sand deposition programme to 15 to 20 weeks. The timescales of 15-20 weeks have been allowed for in this ES as a reasonable worst case scenario, however it is considered that 8 weeks is more likely.
- 4.3.16 On completion of the operation, the pipeline would be dismantled and removed from site, either towed away by sea or dismantled and removed from site by road (both eventualities have been allowed for in this ES). The new beach area would be likely to be suitable for demobilisation of the pipeline.
- 4.3.17 NRW have provided comment that following the completion of pipeline construction works at Traeth Pensarn for Phase 1 of The Colwyn Bay Waterfront project, plant tracks were left within the shingle area above MHWST. To address this concern for these work, prior to the commencement of construction, a specific method statement for appropriate beach reinstatement would be put in place. This would require signoff by CCBC before the contractors would be permitted to demobilise from site.

Photo 4.1: Floating the pipeline at high tide during previous Phase 1 works at Pensarn Beach



Source: CCBC

Photo 4.2: Beach recharge works during previous phase – view from TSHD of the floating pipeline



Source: CCBC

Photo 4.3: Beach recharge works during previous phase – view from shore of the sinker and shore pipelines with the TSHD and floating line in the distance



Source: CCBC

Photo 4.4: Beach recharge works during previous phase – plant movements in the intertidal area



Source: CCBC

Promenade Works

- 4.3.18 Promenade works would commence in general after seawall repairs, outfall extensions, terminal groyne improvements and beach recharge have been completed, however it is considered likely that there is some overlap for certain activities.

- 4.3.19 Where land based works are required to support the extension of the outfalls, these works would take place prior to, and concurrently with, the coastal aspect of the works.
- 4.3.20 Demolition (where necessary) and clearance of existing structures (shelters and kiosks) would be required, along with removal of hard landscaping and street furniture.
- 4.3.21 Some works on the seawall repairs would also be completed from the landward side. The seaward edge of the promenade would be inspected, and potential structural repairs carried out to increase the lifespan and the protection afforded by the structure. If voids in the highway or Promenade are detected, these would be repaired (using standard methods, such as excavating voids and backfilling with compacted granular fill). As part of the works, any new drainage pipes, service ducts, kerbing, and foundations for street lighting/signage would be constructed.
- 4.3.22 New concrete slabs would be installed behind the sea wall, along with excavation in the area of new parking bays at the Rhôs-on-Sea end of the Scheme and installation of the necessary carriageway construction.
- 4.3.23 The existing bituminous surface throughout the Scheme area would be planed off, with new kerbs and gullies (and gully connections) installed in the necessary locations. New infrastructure would then be installed (lighting columns, parking meters, EV chargers, all ducting, signs, public realm equipment that doesn't sit on the final surface etc) and the necessary power/service connections would be completed (including to the kiosk locations and empty ducts to shelter locations).
- 4.3.24 The public realm and carriageway areas would then be re-surfaced with bituminous material as specified, followed by installation of additional above ground public realm equipment/infrastructure, along with new road markings, signage, artwork features, soft landscaping etc.
- 4.3.25 Standard construction plant would be utilised for the above including various sizes of 360° excavators, dumper trucks, concrete pumps and mixer trucks, HGVs for deliveries, powered hand tools, generators, cranes and surfacing plant. Vacuum excavators are likely to be used in the vicinity of utilities to prevent utilities strikes and road marking equipment would also be utilised.
- 4.3.26 The existing electricity sub-station will be re-clad to be in-keeping with the replacement kiosks. Both the sub-station re-cladding and the replacement kiosk will be completed as a separate project (although potentially running concurrently) to the Scheme.

Access

- 4.3.27 The site is readily accessible from the A55 Expressway. The top of the wall is accessible along the Promenade for road transportable equipment. There is a 7.5T weight limit on the Promenade and the existing wall would need to be assessed for construction loads.
- 4.3.28 Slipways would be managed to maintain emergency use throughout the works. The beach is generally a medium density sand that can be traversed by tracked vehicles. There is potential for soft areas that would have to be assessed during the works. The use of "bog mats" may be required to provide access in certain areas.

4.4 Minimisation of disruption due to construction

Construction strategy to minimise disruption

- 4.4.1 Construction of the Scheme would cause a degree of disruption to the local environment, local people and to users of the local highway network. Such disruption is unavoidable, although