

CPAT Report No. 1582

East Rhyl Coastal Defence Scheme




Archaeological Watching Brief



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CLWYD-POWYS ARCHAEOLOGICAL TRUST

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Summary

The Clwyd-Powys Archaeological Trust conducted a watching brief, on behalf of JBA Consulting, during the excavation of four test pits in connection with proposals for a new coastal flood defence scheme at Rhyl, Denbighshire.

The results have confirmed evidence provided during previous geotechnical investigations, revealing the presence of tidal flat deposits along the length of the beach at depths of between 1.2m and 1.8m below the current beach level. These deposits increase in thickness from 0.2m in the west to 0.7m in the east. The deposits were seen to contain lenses of peat and other organic remains and have the potential to preserve important evidence relating to coastal change and human activity during the Mesolithic and later prehistoric periods.

1 Introduction

- 1.1. The Clwyd-Powys Archaeological Trust was invited by JBA Consulting to conduct a watching brief during the excavation of four test pits in connection with proposals for a new coastal flood defence scheme at Rhyl, Denbighshire (Fig. 1; SJ 02265 82483).
- 1.2. The East Rhyl Coastal Defence Project is a key Denbighshire County Council flood defence scheme to be constructed to protect the Garford Road area of east Rhyl, between an area known as Splash Point and the western boundary of the Rhyl Golf Course. An offshore breakwater with a beach recharge was initially considered to achieve the required form of coastal defence, however the option was rejected following initial coastal hydrodynamic modelling and a scheme to upgrade the existing defences with a new rock revetment and re-curve wall has now been confirmed as the preferred option by the Welsh Government and will be taken forward to design. The intended finish of construction of the project is September 2019 with the preconstruction completed by June 2018 (JBA Consulting 2018, 2).
- 1.3. A desk-based study (Jones and Watson 2017) was previously undertaken by CPAT to assist in determining between two options to increase the coastal resilience at western Ffrith Beach.
- 1.4. A programme of ground investigations were undertaken in October 2017 on the upper part of the beach, the promenade and the concrete steps of the existing revetment and recurve wall (JBA Consulting 2018). The ground investigation found that the existing sea defences are built upon an embankment of granular fill typically described as medium dense to dense sandy gravel with a variable cobble and fines content. On the beach, the beach sands typically comprised slightly gravelly to gravelly fine to coarse sands with shell fragments. Beneath the embankment fill of the existing defences or the beach sands on the beach, the ground conditions typically comprised:
 - Tidal flat deposits - variously very soft to firm sandy organic silty Clays with subordinate peat and sand layers.
 - Fluvio-glacial deposits - variously loose to medium dense gravelly to very gravelly Sands or sandy - very sandy Gravels with a subordinate silt content.
 - Glacial Till deposits - typically firm or firm to stiff, locally soft, slightly sandy slightly gravelly Clays, with occasional sand lenses / horizons, locally laminated, becoming stiff to very stiff at depth.
 - Weathered Sandstone - bedrock inferred from sand unit, encountered at the base of the glacial till, described as very dense fine to coarse sand with weathered clay and silt laminated beds

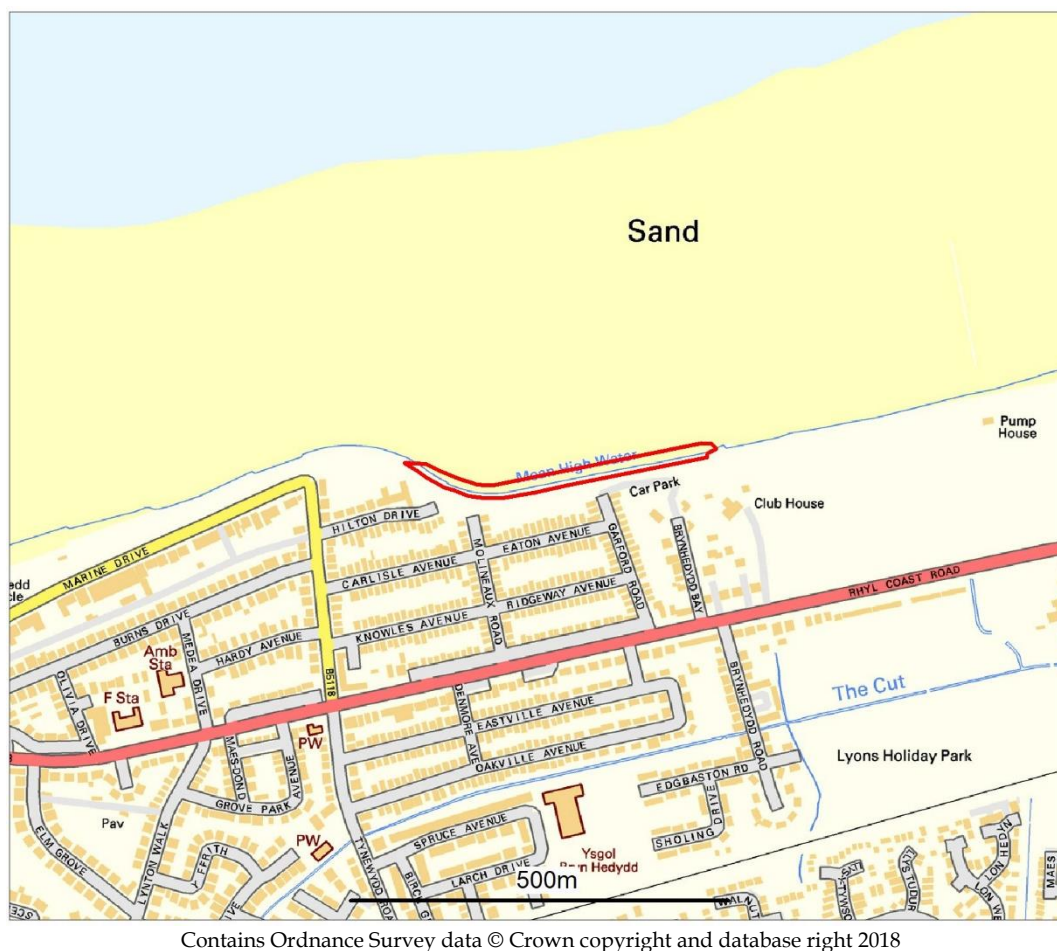


Fig. 1 Location of the East Rhyl Coastal Defence Scheme (in red)

2 Historical Background

- 2.1. From the end of the last glaciation (c. 10,000 BC) to the early Neolithic (c. 4,000 BC) sea-levels rose rapidly (Tooley 1985), followed by a period of lesser oscillatory movements. The local effects were often complicated, not least as a result of isostatic recovery, so that Tooley has identified 12 periods of what he terms 'transgressive overlap tendencies' and a further 12 'regressive overlap tendencies' (Tooley 1982; 1985; 1986). In other words, the sea level rose and fell in broad patterns, but with local variations which sometimes overlapped. Sea level appears to have reached a maximum at about 2,300 BP before falling again (Tooley 1978; 1985). During more stable times, land surfaces would have developed, only to be inundated and subsequently buried beneath marine and estuarine deposits.
- 2.2. The effect of successive marine transgressions on the area around the mouth of the River Clwyd has been examined by Manley (Manley 1981; 1989), based largely on the results of borehole data. During the Mesolithic period major transgressions may have made Rhuddlan a coastal location, with the low-lying area between Rhyl and Prestatyn transgressed. Areas of elevated boulder clay might have remained above sea level and been occupied as the most seaward habitable land. This may account for the distribution of shell beds and Mesolithic finds reported around Rhyl. The more major transgressions may have covered the elevated boulder clay, although

during periods of regression it is possible that low lying areas may have been settled before being inundated by later transgressions. It is clear that during this period vast tracts of coastal plain were inundated, although the highest absolute sea levels probably occurred during the Roman and early post-Roman period.

- 2.3. Borehole data from 1984, which was analysed by Manley (1989), revealed peat, suggesting former landsurfaces, at two separate depths, with an upper level at around 2m OD and a lower peat at 1m to 2m below OD. Based on the distribution of cores containing the upper peat deposit Manley postulated the position of a prehistoric coastline in the area of Rhyl town, perhaps dating between c. 4000 BC and 3000 BC, between 125m and 600m inland of the present coast.
- 2.4. Further evidence for coastal change is provided by the remains of a submerged forest on the foreshore, which was noted by Thomas Pennant near Abergele (1784, 349), while a similar phenomenon was revealed at Rhyl in 1893, as detailed in the following account from the North Wales Chronicle (11 February 1893):
- ‘The action of the tide at Rhyl within the last few days has disclosed the singular sight of an ancient forest, which, for a period of eighty years has been completely covered by the sea. The scoured portion of the beach where the remarkable sight is presented is situated opposite the Marine Drive, about a mile east of the pier. The town surveyor Mr R. Hughes has made an accurate plan of the place, which shows about thirty trees rooted as they grew, whilst there are a number of horizontal trunks which appear to rest as they fell. Several of the trees have been proved to be of oak and elm, and the remainder appeared to be birch, alder and hazel. The stumps vary in diameter from 12 to 24 inches, and are situated about 100 yards from the edge of the sandhills and are covered during high spring tides by about 10 feet of water. The scoured portion in the sands, which exposes these old roots, extends for about 550 yards in length and varies in width from 7 to 35 yards. Folk lore asserts that this is part of an old forest, the portion in question being known as ‘Coed Mawr y Rhyl’.
- 2.5. The remains on Rhyl beach were recorded again in October 1912 when around 200 tree stumps were recorded between Rhyl pier and about half way from the east end of Rhyl to the centre of Prestatyn, while in August 1918 up to 100 stumps were noted. Birch and scots pine are most commonly found, but also oak, elm and alder (Ashton 1920, 175).
- 2.6. Archaeological evidence for prehistoric activity along the coastal strip comes entirely from artefactual evidence. Glenn (1935, 207) recorded over 70 prehistoric objects from peat and estuarine or marine clays on Rhyl foreshore, which have also produced an antler mattock, found in 1910, from near Splash Point, which has been dated to 6560±80 BP (Bonsall and Smith 1990). This one of only two such artefacts from Wales and their contexts of discovery suggest that they may have been used for digging, perhaps for shellfish, in soft coastal sediments (Lynch *et al.* 2000, 29). Other artefacts include Neolithic axe heads and a Bronze Age socketed spear head and a bronze chisel.
- 2.7. Evidence for a continuation of the peat beds, as well as further elements of the submerged forest, has come to light recently in studies associated with the

-
- construction of an on-shore cable connection for the Burbo Bank Offshore Windfarm. Fieldwalking of the intertidal zone identified several areas of exposed peat and one tree stump around 1.25km east of Splash Point (Rutherford 2016).
- 2.8. The full extent of the peat deposits are currently unknown, although they have considerable potential for artefactual remains and palaeoenvironmental data which is considered to be potentially of national importance.
- 2.9. Remains of possible early sea defences or fish traps (PRN 123322) have been identified within the study area, close to Splash Point, comprising a series of wooden posts set in roughly parallel short trenches filled with stone. These were seen to have been cut through the peat deposits, rather than being associated with the prehistoric finds that have been recovered from the immediate surrounding area (Denbighshire
- 2.10. It is also evident that the depiction of the sea front on the Tithe map is some 140m further inland than the present front, which has undergone considerable redevelopment, particularly for the leisure and tourism industry.

4 Ground Investigations October 2017

4.1. A programme of ground investigations was conducted in October 2017 by Geotechnics Limited (BH100 to BH104) and Lankelma (WS100CPT to WS104CPT, BH100CPT and CPT100 to CPT111). The ground conditions revealed are summarised below, while the location of the boreholes is shown in Fig. 8.

Strata	Typical Description	Top Level (m AOD) [Thickness (m)]
Made ground (Concrete)	Concrete - predrilled prior to CPT (Promenade: BH100/100CPT, BH102, BH103, CPT108/8A, CPT109, WS100-WS104B) (Revetment: all HDP / concrete cores)	Promenade: 6.48 - 6.28 [0.16 - 0.34] Revetment steps: 4.61 - 3.18 [>0.67 - 1.51]
Made ground (Embankment Fill)	Sandy Gravel with a variable cobble and fines content. The gravel and cobbles being of mixed lithologies. (BH100, BH102 & BH103, WS100CPT - WS104B, BH100CPT, CPT108 - CPT109 only)	6.28 - 6.02 [2.81 - 4.33]
Marine Beach	Very light brown slightly gravelly to gravelly fine to coarse Sand in places with a high cobble content. (BH101 & BH104, CPT100 - CPT107 & CPT110 - CPT111 only)	2.70 - 1.51 [0.10 - 2.08]
Tidal Flat Deposits	Variously very soft to firm sandy organic silty Clays with subordinate peat and sand layers. (All boreholes and CPT's that penetrated to depth, except CPT100 on the beach at the north- western extremity of the site).	Promenade: 3.21 - 1.94 [1.38 - 4.00] Beach: 1.91 to 0.26 [0.55 - 2.21]
Fluvio-glacial Sands and Gravels	Variously loose to medium dense gravelly to very gravelly Sands or sandy - very sandy Gravels with a subordinate silt content. (All BH's & CPT's except WS104CPT, WS104ACPT & CPT108).	0.89 to -1.08 [1.00 - 4.84]
Glacial Till	Typically firm or firm to stiff, locally soft, slightly sandy slightly gravelly Clays, with occasional sand lenses / horizons, becoming stiff to very stiff at depth. Locally laminated (All CPT's and BH's, except BH104, WS104CPT, WS104ACPT & CPT108).	-2.02 to -4.46 [4.63 - 15.50]
Sand (weathered sandstone)	Bedrock inferred from sand unit, encountered at the base of the glacial till, described as very dense fine to coarse sand with weathered clay and silt laminated beds Encountered in BH100 & BH102 and in all CPT's except CPT102, CPT104, CPT108, CPT108A, CPT109, WS102CPT, WS104CPT & WS104ACPT).	-7.63 to -17.58 [Limited penetration to max 2.15m proven]

5 Watching Brief

- 5.1. The watching brief was conducted according to the Chartered Institute for Archaeologists' (CIfA) *Standard and Guidance for an Archaeological Watching Brief* (2014), monitoring the mechanical excavation of four trial pits over a three-day period in April 2018. The results are summarised in Fig. 6, while the location of the trial pits is depicted on Fig. 7.
- 5.2. The ground conditions were such that each of the trial pits proved unstable, owing to the presence of an artesian layer below the beach, and it was only possible to make remote observations as work progressed.

Trial Pit 100 (3m x 5m)

- 5.3. The overlying beach sand, a deposit of yellowish brown fine to medium sand containing shell fragments and an undiagnostic piece of timber (1.2m in length), was removed to a depth of 0.7m. The underlying deposits were as follows:
- A grey silty sand and coarse gravel (0.2m thick) containing fragments of angular limestone cobbles (assumed to be the eroded remains of the existing rock revetment).
 - At a depth of 0.9m-1.9m, a firm bluish-grey sandy silt (Tidal Flat deposit).
 - At 1.9m - 2m, a light reddish brown sandy clay containing some organic preservation.
 - At 2m- 3m, a firm reddish-grey fine coarse sand and gravel (Glacial Till deposit).
 - 3m - 3.1m, as above but firmer. End of excavation owing to rapid water ingress.



Fig. 2 Trial Pit 100, viewed from the south. Photo CPAT 4490-0006

Trial Pit 101 (3m x 5m)

5.4. The overlying beach sand, a deposit of yellowish brown fine to medium sand containing shell fragments, was removed to a depth of 1.0m. The underlying deposits were as follows:

- A grey silty sand (0.4m thick).
- At a depth of 1.0 - 1.2m a firm bluish-grey sandy silt (Tidal Flat deposit).
- At 1.2m - 1.4m, a dark brown peat with organic preservation (Tidal Flat deposit).
- At 1.4m - 1.8m, a silty bluish-grey clay (Tidal Flat deposit)
- At 1.8m - 3.3m, a stiff reddish grey clay, becoming sandier with organic material present at approximately 2m.
- 3.3m - 3.6, as above but sandier. End of excavation due to moderate water inflow.



Fig. 3 Trial Pit 101 viewed from the south, organic peat deposits visible in section.
Photo CPAT 4490-0009

Trial Pit 102 (3m x 5m)

5.5. The overlying beach sand, a deposit of yellowish brown fine to medium sand containing shell fragments, was removed to a depth of 1m. The underlying deposits were as follows:

- A dark brown/black silty sand and gravel (5-10cm thick) with cobbles and organic (peat?) material.
- At a depth of 1.5m - 1.8m a firm bluish-grey sandy silt (Tidal Flat deposit). Slow inflow of water between 1m - 1.5m.

- At 1.8m – 2.5m, a firm and fairly dry dark brown peat with organic preservation (Tidal Flat deposit). A 10ltr sample of this material was retained for possible analysis.
- At 2.5m – 2.8m, a bluish-grey silty sand and gravel. End of excavation due to moderate water inflow.



Fig. 4. Trial Pit 102, viewed from the south-east, organic peat deposits visible in section. Photo CPAT 4490-0004

Trial Pit 103 (3m x 5m)

5.6. The overlying beach sand, a deposit of yellowish brown fine to medium sand containing shell fragments, was removed to a depth of 0.4m. The underlying deposits were as follows:

- A greyish-brown silty sand (0.6m thick).
- At 1m – 1.1m, as above but with blackened shell fragments.
- At 1.1m – 1.6m, a grey sandy silty with some plant remains (Tidal Flat deposit).
- At 1.6m – 1.9m, a firm and fairly dry dark brown peat with organic preservation (Tidal Flat deposit).
- At 1.9m – 2.5m, a firm grey sandy silt interbedded with dark brown peat. (Tidal flat deposit). Good wood preservation, some pieces in the round – sample retained.
- At 2.5m – 3m, a brown-grey silty gravel with fine to coarse sand. Some small cobbles present.
- 3m – 3.45m, a reddish brown fine to coarse sand. End of excavation due to moderate water ingress.



Fig. 5. Trial Pit 103, viewed from south. Photo CPAT 4490-0011

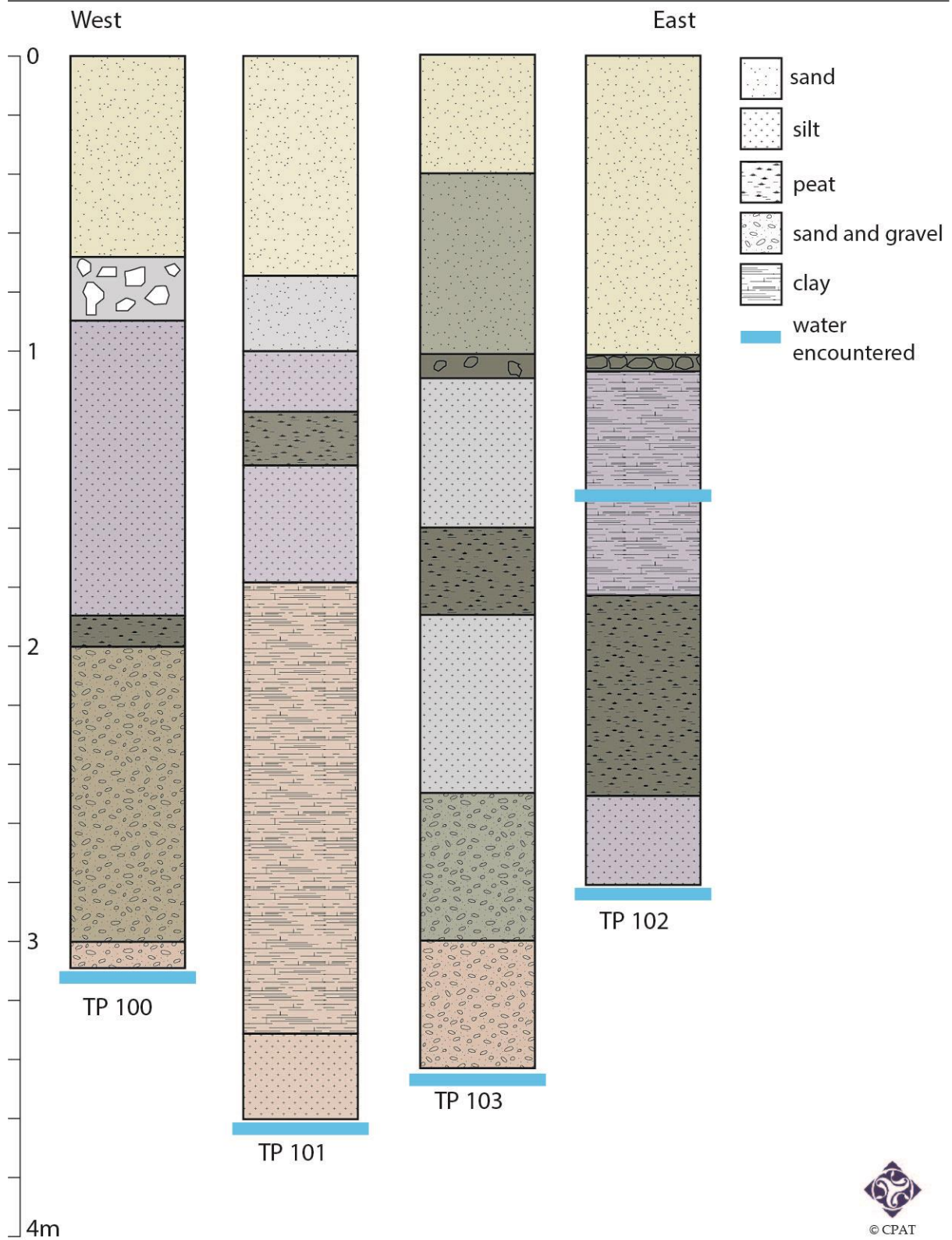


Fig. 6. Stratigraphic record of the test pits

6 Conclusions

- 6.1. The watching brief was conducted during the excavation of four trial pits on the beach, along the length of the proposed coastal defence scheme. The results have confirmed evidence provided during previous geotechnical investigations, revealing the presence of tidal flat deposits along the length of the beach at depths of between 1.2m and 1.8m below the current beach level. These deposits increase in thickness from 0.2m in the west to 0.7m in the east. The deposits were seen to contain lenses of peat and other organic remains and have the potential to preserve important evidence relating to coastal change and human activity during the Mesolithic and later prehistoric periods.
- 6.2. There is, however, currently insufficient data to assess the likely archaeological potential and significance of the deposits within the study area and further investigations and specialist analysis will be required.

7 Sources

- Ashton, W., 1920. *The evolution of a coastline, Barrow to Aberystwyth and the Isle of Man*. London: Edward Stanford Ltd.
- Bonsall, C. and Smith, C., 1990. Bone and antler technology in the British Late Upper Palaeolithic and Mesolithic: the impact of accelerator dating, in P. M. Vermeersch and P. Van Peer (eds) *Contributions to the Mesolithic in Europe*, 359-368. Leuven: Leuven University Press.
- Glenn, T., 1935. Distribution of the Graig Lwyd axe and its associated cultures. *Archaeologia Cambrensis* 90, 189-218.
- JBA Consulting, 2018. *East Rhyl Coastal Defence Scheme: Ground Investigation report*. Unpublished report. Jeremy Benn Associates Ltd.
- Jones, N. W. and Watson, S., 2017. *East Rhyl Coastal Defence Scheme: Desk-based Assessment*. Unpublished report. CPAT Report No. 1505.
- Lynch, F., Aldhouse-Green, S. and Davies, J. L., 2000. *Prehistoric Wales*. Stroud: Sutton Publishing Ltd.
- Manley, J., 1981. Rhuddlan and Coastal Evolution
- Manley, J., 1989. Rhyl and Coastal Evolution, *Journal of the Flintshire Historical Society* 32, 181-9
- Owen, W., 1994. Rhuddlan Historic Settlements. CPAT Report 116
- Pennant, T., 1784. *Tours in Wales, 1770* (2 vols). London.
- Rutherford, M., 2015. *Burbo Bank Extension Offshore Wind Farm, Denbighshire: Intertidal Auger Survey Report Version 2*. Oxford Archaeology North (OA North) 2016-17/1759
- Thompson, F., H. (ed), 1980. *Archaeology and Coastal Change*. London: Society of Antiquaries occasional papers, new series 1.

- Tooley, M. J., 1974. Sea level changes during the last 9000 years in north-west England, *Geographical Journal* 140, 18-42.
- Tooley, M. J., 1978. *Sea-Level Changes: North-West England during the Flandrian Stage*. Oxford.
- Tooley, M. J., 1980. Theories of coastal change in north-west England, in F. H. Thompson (ed) 1980, 74-86.
- Tooley, M. J., 1982. Sea-Level Changes in Northern England, *Proceedings of the Geological Association* 93(1), 43-51.
- Tooley, M. J., 1985a. Sea-Levels, *Progress in Physical Geography* 9(1), 113-120.
- Tooley, M. J., 1985b. Climate, sea-level and coastal changes, in M. J. Tooley and G. M. Sheail (eds), *The Climatic Scene*, 206-234.
- Tooley, M. J., 1985c. Sea-level changes and coastal morphology in North-west England, in R. H. Johnson (ed) *The Geomorphology of North-West England*, 94-121. Manchester: Manchester University Press.
- Tooley, M. J., 1986. Sea-levels, *Progress in Physical Geography* 10(1), 120-9.
- Weigel, B., 2015. *Burbo Bank Extension Offshore Wind Farm, Denbighshire, Archaeological Evaluation Report*. Oxford Archaeology North (OA North) 2014-15/1598

Cartographic Sources

- Map of the Common Marshes and Waste Lowlands in the several parishes of Abergele, St. Asaph,
- 1794 Rhuddlan, Dyserth and Meliden CROH DC/219
- 1794 Rhuddlan Embankment Act CROH DIDM/275/1(d)
- 1815 Rhuddlan Enclosure Award CROH QS/ED/14
- 1819 Ordnance Survey Surveyors' Drawing 319
- 1839 Rhuddlan Tithe Survey
- 1839 Meliden Tithe Survey
- 1842 Enclosure of Rhyl Marsh, 1842 CROH NT/M/10-11
- 1870 Meliden Enclosure Award 1870 CROH QSIDE/27
- 1871 Ordnance Survey 1st edition 25" map, Flintshire 1.10
- 1871 Ordnance Survey 1st edition 25" map, Flintshire 1.11
- 1889 Ordnance Survey 2nd edition 25" map, Flintshire 1.10
- 1889 Ordnance Survey 2nd edition 25" map, Flintshire 1.11

8 Archive deposition Statement

- 8.1. The project archive has been prepared according to the CPAT Archive Policy and in line with the CIfA *Standard and guidance for the creation, compilation, transfer and deposition of archaeological archives guidance* (2014). The digital archive only will be deposited with the Historic Environment Record, Clwyd-Powys Archaeological Trust and the paper/drawn/digital archive with the National Monuments Record (RCAHMW).

CPAT Event PRN: 140238

3 Watching Brief forms

17 digital images, CPAT film no. 4490

4 Sample Record Forms

Samples:

Test Pit 102 – 10lt sample of tidal flat deposit

Test Pit 103 – sample of wood from tidal flat deposit

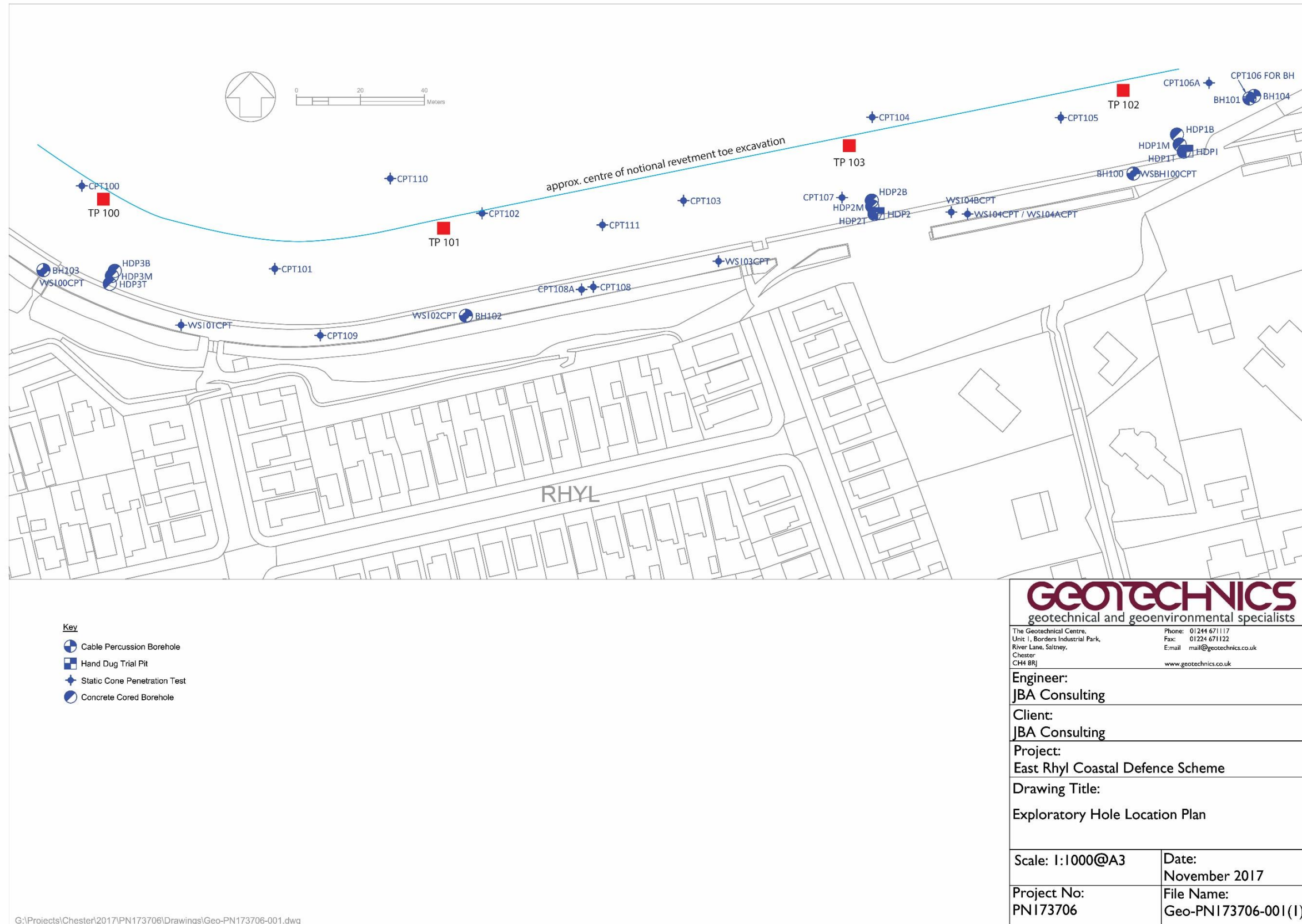


Fig. 7 Ground investigation locations

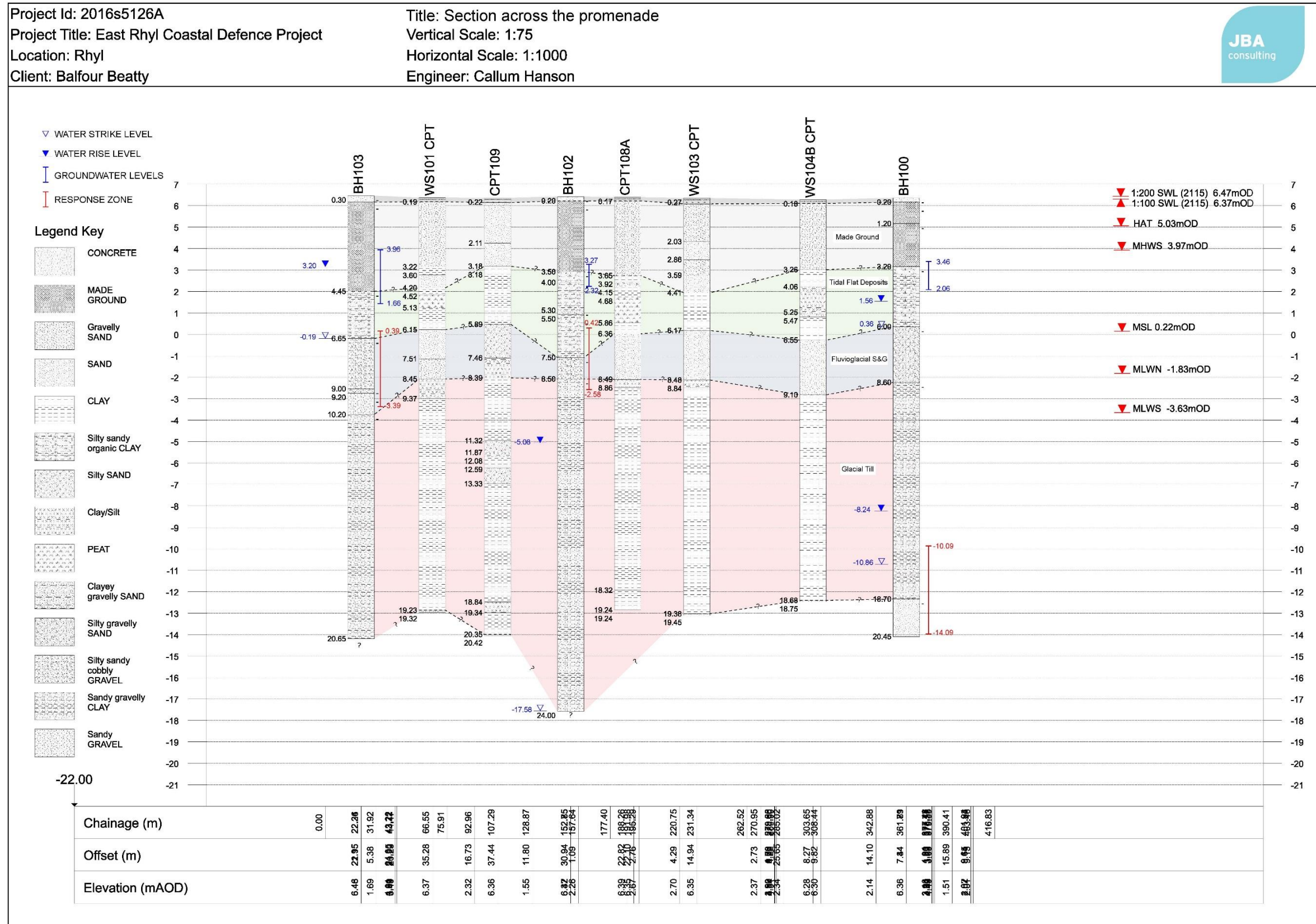


Fig. 8 Stratigraphic section across the promenade (after JBA Consulting 2018)

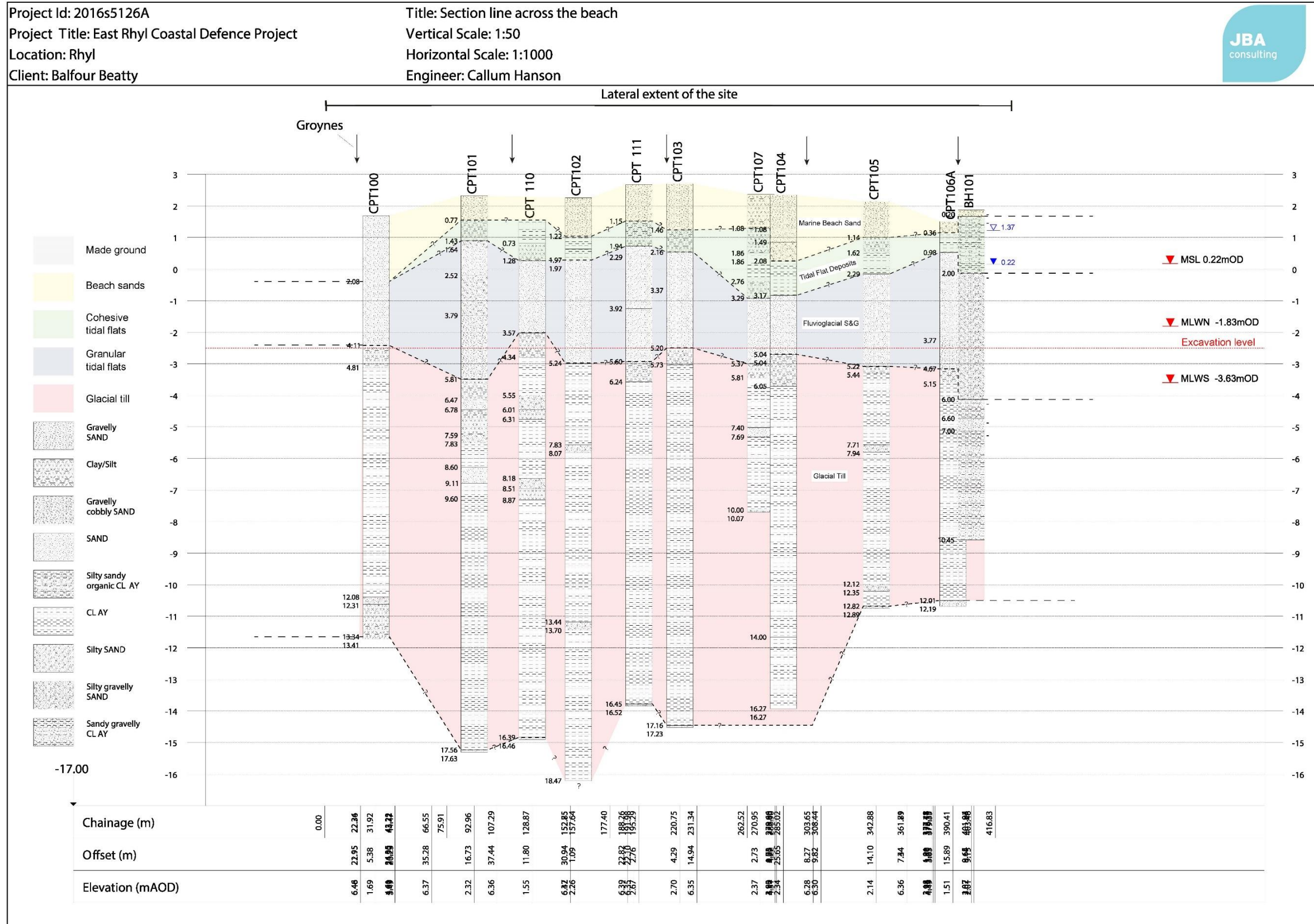


Fig. 9 Stratigraphic section across the beach (after JBA Consulting 2018)