



Cell 1 Regional Coastal Monitoring Programme Walkover Inspection Surveys 2020



Durham County Council

September 2020

Durham County Council

Walkover Inspection Surveys 2020

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Preamble

The Cell 1 Regional Coastal Monitoring Programme covers approximately 300km of the north east coastline, from the Scottish Border (just south of St. Abb's Head) to Flamborough Head in East Yorkshire. This coastline is often referred to as 'Coastal Sediment Cell 1' in England and Wales (Figure 0-1). Within this frontage the coastal landforms vary considerably, comprising low-lying tidal flats with fringing salt marshes, hard rock cliffs that are mantled with glacial till to varying thicknesses, softer rock cliffs, and extensive landslide complexes.

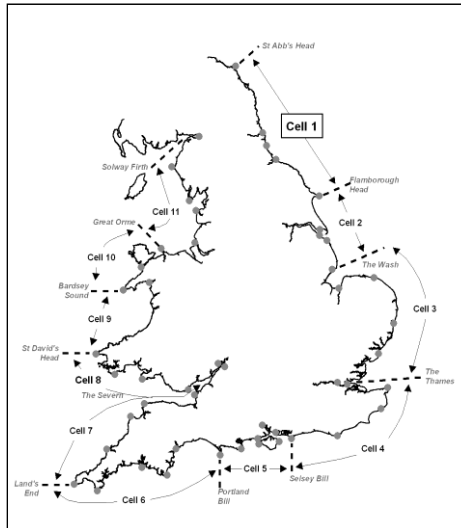


Figure 0-1 - Sediment Cells in England and Wales

The work commenced with a three-year monitoring programme in 2008 that was managed by Scarborough Borough Council on behalf of the North East Coastal Group. This initial phase was followed by a five-year programme which started in 2011 and the current five-year programme which started in 2016. The programme funded by the Environment Agency, working in partnership with the following organisations.



The main elements of the Cell 1 Regional Coastal Monitoring Programme involve:

- beach profile surveys
- topographic surveys
- cliff top recession surveys
- real-time wave data collection
- bathymetric and sea bed characterisation surveys
- aerial photography
- walkover inspection surveys

Royal HaskoningDHV has been appointed to provide Analytical Services in relation to the Cell 1 Regional Coastal Monitoring Programme 2016 - 2021.

The present report is **Walkover Inspection Surveys 2020** and provides a summary of the main findings from the walkover inspections of Durham County Council's frontage that are undertaken once every 2 years.

In addition, separate reports are produced for other elements of the programme as and when specific components are undertaken, such as beach profile, topographic and cliff top surveys, wave data collection, bathymetric and sea bed sediment data collection, and aerial photography.

1. Introduction

1.1 Study Area

Durham County Council's frontage is approximately 17.5km in length and extends from Ryhope Dene at the boundary with Sunderland in the north to Crimdon Beck at the boundary with Hartlepool in the south, see Figure 1-1. This frontage includes approximately 35 coastal assets, 27 of which are man-made assets while 8 are natural assets. Detailed maps showing the location of each of these assets are presented in **Appendix A**.

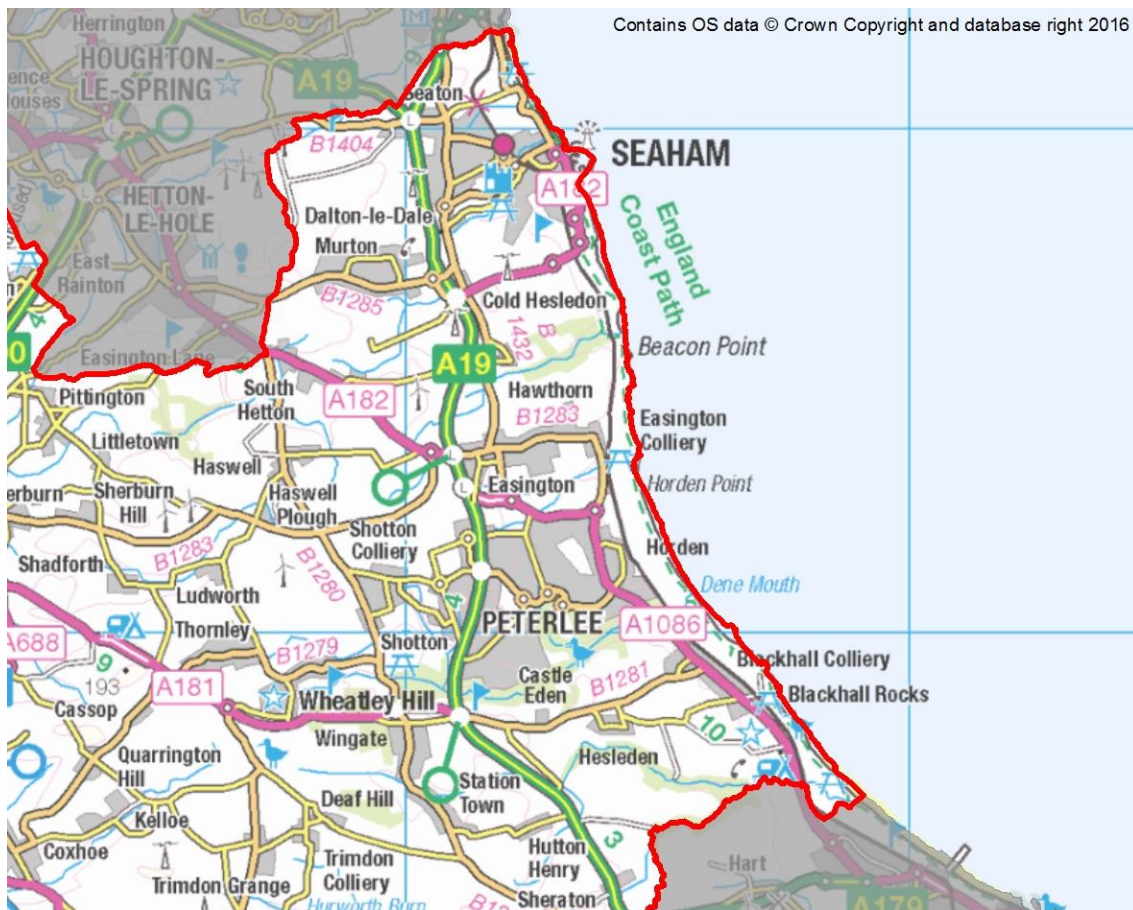


Figure 1-1: Durham County Council study area

1.2 Methodology

This section presents the approach taken by the asset inspectors for the Durham County Council coastal frontage.

The walkover inspection surveys for the Durham County Council frontage were undertaken on 22nd June, 17th August and 19th August 2020. The weather experienced during the inspections was adequate causing no access or visibility problems.

The frontage has been split into a number of 'asset lengths' (Appendix A), as defined in the National Flood and Coastal Defence Database (NFCDD) that was established by the Environment Agency.

The walkover inspections cover both built defence assets and natural defence assets such as cliffs, slopes and dunes. All assets were visually inspected, photographed and graded based on their condition and an estimate made of their residual life.

For built assets the grading classification was undertaken in accordance with the Condition Assessment Manual (EA, 2012), with estimates made of the urgency of any necessary repairs. An extract of the grading classification for built assets is presented in *Table 1-1*. For ease of reference the built asset photographs presented in this report have also been bordered with the colours key indicated below.

| Grade | Rating | Description |
|-------|-----------|--|
| 1 | Very Good | 'As built' condition or cosmetic defects that have no effect on performance. |
| 2 | Good | Minor defects that will not reduce overall performance of the asset. |
| 3 | Fair | Defects that could reduce overall performance of the asset. |
| 4 | Poor | Defects that would significantly reduce overall performance of the asset. |
| 5 | Very Poor | Severe defects resulting in overall performance failure of the asset. |

Table 1-1: Condition assessment grading for man-made assets.

In addition to the above grading classification, for natural assets such as cliffs and slopes the same five point activity scale used in previous walkover inspections within Cell 1 was used. This grading classification is presented in *Table 1-2*. For ease of reference the natural asset photographs presented in this report have also been bordered with the colours key indicated below.

| Grade | Class | Description |
|-------|----------------|--|
| 1 | Dormant | Features with no interaction with marine processes. |
| 2 | Inactive | Features with no visible evidence of erosion or landsliding activity. |
| 3 | Locally active | Features with localised evidence of small erosion or landsliding activity. |
| 4 | Partly active | Features with widespread evidence of small erosion or landsliding activity or areas of intense erosion or landsliding. |
| 5 | Totally active | Features with large-scale or intense erosion or landsliding. |

Table 1-2: Condition assessment grading used for natural assets (cliffs/ slopes).

This report provides an overview of the findings from the walkover inspections, summarising each locality in general but also specifically identifying individual assets in 'poor' or 'very poor' condition. It is anticipated that this summary will help identify areas for maintenance or capital investment. Full details of the inspection of each asset are provided in **Appendix B**.

In addition to this report, full details of the inspection and a selection of appropriate photographs have been entered into the SANDS (Shoreline And Nearshore Database System) database and provided along with this report with SANDS viewer software.

2. Overview

The following significant findings were observed during the 2020 walkover inspection surveys:

- **Ryhope Dene to Seaham Hall picnic site** – Similar to previous inspections, ongoing slumping of the upper Glacial Till layer along the entirety of the frontage, lack of vegetation indicates recent activity. Much of the Limestone base was concealed by the slumped material.
- **Seaham Hall picnic site** – No apparent change to the outflanking of the revetment by the beach access steps
- **Seaham sea wall northern tie-in** – A slippage was observed at the south end of the seawall above the blockwork revetment spilling onto the foreshore. The outflanking of the blockwork revetment, reported previously, was concealed by high beach levels.
- **Seaham sea wall and promenade** – The structure overall remains in fair condition but deteriorates to the south with localised areas considered in poor condition. Joints in several areas of the sea wall would benefit from re-sealing. Previously reported defects to the access ramp at the south of the promenade were concealed by high beach levels. It is however believed the defects remain and it is recommended that immediate remedial works should be undertaken to trim protruding reinforcement bars. Damaged/missing flap valves remain. Shallow sloping concrete apron to the south in poor condition with large sections missing and voiding visible beneath toe.
- **Dawdon Dene outfall** – No apparent change to either the eroding section of masonry wall above a sloping poured concrete revetment or the eroding section of cliff affecting fence line. Beach levels were approximately 1m lower than at the time of the previous inspection.
- **Seaham Harbour** – As per previous inspections, large sections were not inspected due to restricted access to the port. There was no significant change to visible assets. However, as reported in 2018, all assets have some open joints between masonry blocks in their faces and these would undoubtedly benefit from a routine maintenance programme involving re-pointing, with a small number of asset lengths being particularly in need of such attention. Access to the inner beach via an access ramp was prevented.
- **Seaham Harbour South Pier** – This was only inspected from a distance but damage to the root of the pier remained. The uneven profile suggests settlement issues. It is recommended that a detailed vessel-based and underwater inspections are undertaken and a maintenance programme should be put in place
- **Shot Rock to Loom** – Actively eroding cliffs with significant debris slumped at the toe. Large slumping failure at the cliff top has cut off the coastal footpath and displaced the field boundary. It is recommended that the footpath is diverted immediately.
- **Crimdon Dene Caravan Park** – Similar to previous inspections, there is ongoing slumping of the upper Glacial Till layer along long stretches of the frontage. The lack of vegetation indicates recent activity. Near the north end of the caravan park, there are extensive cliff slumps and cliff failures. The access steps have been closed due to cliff falls. As the cliff is expected to continue to erode the fence should be regularly relocated as required.

3. Condition Assessment

3.1 Pincushion Rocks to Chourdon Point (MA 09)

3.1.1 Ryhope Dene to Seaham

The most northern asset length (/B0804C01) within Durham County Council's jurisdiction extends along undefended sea cliffs from Ryhope Dene to the picnic site located at the north of Seaham, near Seaham Hall. The cliffs comprise of a large glacial till layer, mantled on smaller Magnesian Limestone base. As reported in previous inspections, the glacial till is experiencing significant slumping. The lack of vegetation on the slump deposits and on the cliffs themselves observed in 2020 highlights the ongoing erosion. Much of the limestone base to the north is concealed by the slumping till. At one location there is a relatively large 'bench' type failure involving a substantial volume of material.



*Ryhope Dene
(northern boundary of /0804C01)*



Glacial Till slumping along the majority of the frontage (/0804C01)

Further towards the southern end of the frontage length, the harder Magnesian Limestone base is more prominent. There are frequent caves and arches formed in the limestone rock at the base of the cliffs caused by differential erosion by waves. The caves did not appear to have significantly worsened since 2018. At these locations, there is again evidence of recent local slumping in the upper till cliff.



Undefended sea cliffs with till sitting on limestone (/0804C01)



Localised slumping of upper till within the cliffs (/0804C01)

Within this asset length is a set of access steps from the picnic site car park near Seaham Hall with a small stream discharging to the foreshore over an adjacent stone revetment. There was no flow in the stream at the time of the inspection, but the previously identified outflanking of the revetment

appears unchanged since 2018. There is also a small diameter pipe encased in concrete running alongside the steps. This was not discharging at the time of the inspection.



Access steps adjacent stone revetment (/0804C01)



Outflanking of revetment (/0804C01)

Immediately south of the car park access steps is a short undefended length of cliff which continues to show local slippages.

This is followed by a short (approximately 10m) length of low-level wall at the tie-in to the main Seaham seawall to the south. Beach levels at the wall were approx. 0.5m higher than the previous inspection in 2018.

3.1.2 Seaham

Backing the southern end of the low-level tie-in wall, and continuing behind the very northern end of the Seaham sea wall is a blockwork revetment on the backing slope which remains in fair condition. The outflanking at its northern end, reported previously, was largely concealed by high beach levels during the 2020 inspection. There are small slippages in the slope above the revetment, and a more significant slippage was observed at the south end of the seawall. Spalling was noted to the concrete bullnose below the revetment. The access ramp at the northern end to the main Seaham promenade has small cracks in the deck.



Minor outflanking of blockwork revetment and slippage at south end of seawall (/0102C01)



Cracks in deck of access ramp at northern end of promenade (/0102C01)

The main Seaham sea wall is fronted by a high shingle beach. Both the wall and promenade are in fair condition. The condition of the wall deteriorates with progression south. As previously reported, the joints in the main sea wall are mostly intact but a few areas would benefit from re-sealing,

particularly between access steps and the main sea wall. There is some vegetation growth in construction joints and cracks in the promenade, which should be removed and the joints sealed.

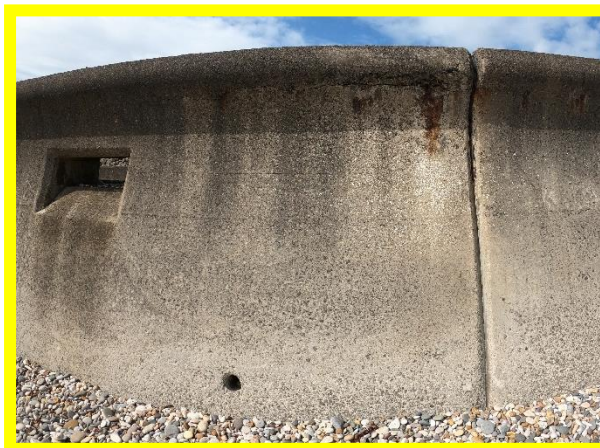


Seaham sea wall (/0102C01)



Sealant missing at joint between sea wall and access steps (/0102C01)

The abrasion damage to the main sea wall increases to the south, but does not significantly affect the overall condition grading. In local areas, spalling/corrosion damage was noted to the bullnose of the seawall. The damaged/missing plastic flap valves on the drainage outlets, reported in 2018, remains. It was noted a cast iron flap valve has now failed also.



Spalling of bullnose on sea wall (/0102C01)



failed cast iron flap valve (/0102C01)

To the rear of the sea wall and promenade there is an area of stone infill between the coastal slopes and the steeper cliffs, which may have been installed to repair a past slope failure. The area of stone infill appears to have 'sunken' into the slope and remedial works are recommended.

Towards the southern end, the sea wall is fronted by remnants of groynes which have a concrete base and timber boards fixed to vertical steel piles. In many places there is no longer timber boarding present and the steel piles remain upstanding and exposed. At its southern end, the seawall is fronted by a shallow sloping concrete apron. It is in poor condition, with large sections broken up and voiding visible beneath the toe.



Failed section of concrete apron (/0102C01)



Remnants of groyne (/0102C01)

At the southern end of the sea wall, the access ramp is heavily abraded and its deck is cracked/broken locally exposing underlying fill which may be vulnerable to washout. It was reported in 2018 that reinforcement is exposed due to abrasion damage posing a health and safety hazard. It is recommended that remedial works should be undertaken to trim protruding bars. Beach levels were higher than 2018 covering some exposed reinforcement.

The cliffs behind the promenade are steeper and past episodes of slippage have left a headscarp visible. As in 2018, no 'fresh' slippages were noted during the 2020 inspection.



Cracks in deck of access ramp at southern end of promenade (/0102C01)



Hole in deck of ramp and exposed reinforcement (/0102C01)



Headscarp in backing cliffs formed by previous slippages (/0102C01)

To the south of the seawall there is a rock armour berm providing toe protection to the cliffs around the headland adjacent to Featherbed Rocks. The rock armour continues south of the headland, initially protecting a short length of concrete wall with a large outfall from the culverted Dawdon Dene, and then protecting the cliffs in front of Allotment Gardens and the northern end of the Seaham War Memorial Gardens. The rock armour appears in good condition. No significant change was observed to the cliffs backing the rock armour in 2020.

However, it has been previously reported that the cliffs to the rear show evidence of slow erosion and slumping of the upper till layers. One rock fall was noted at the cliffs of Featherbed Rocks, just to the north of the outfall, and measurable slumping continued in the cliffs to the south of the culvert. At the Dawdon Dene culvert, beach levels appear significantly (approx. 1m) lower than in 2018.



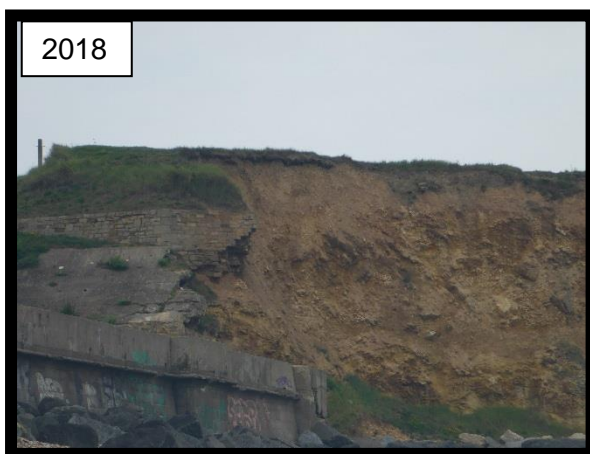
Rock berm around Featherbed Rocks headland (/0103C01)



Rock berm around Dawdon Dene culvert and further south (/0103C04)

At the tie-in of the outfall's concrete platform to the cliffs to the north, a section of masonry wall above a sloping poured concrete revetment is actively breaking up. Although no change was identified between 2018 and 2020, this remains an area of concern.

In addition, a short length of low masonry wall around the southern edge of the outfall's concrete platform has previously been reported as being damaged but remains unrepaired. Immediately south of the outfall's concrete platform cliff recession continues to affect the fence line in the vicinity of the Coastguard Station. In this area the beach levels appeared up to 1m lower than in 2018 exposing more rock armour which appeared in fair condition.



Masonry wall and concrete revetment at tie-in to cliffs breaking-up (/0103C04)



Masonry wall and concrete revetment at tie-in to cliffs breaking-up (/0103C04)



Erosion affecting fence line of properties to south Dawdon Dene Outfall -2018 (/0103C02)



Erosion affecting fence line of properties to south Dawdon Dene Outfall - 2020 (/0103C02)

The rock armour starts to taper out with progression south and forms a transition from defended to undefended sections of cliff. The cliff line generally appears stable and was noted to be well vegetated in 2020 inspection. However, as reported previously, there does appear to small areas of historic local slumping. Access to the cliff top has been prevented by fencing along the War Memorial Gardens.

The beach access ramp and steps to the small pocket beach below these cliffs, located just north of Seaham Harbour, are supported by a vertical concrete retaining wall that has a number of cracks in the rendered face and visible gaps between the wall and its coping. A deck slab has moved, potentially due to settlement, posing a trip hazard. There is some vegetation growth in open joints of the deck slab that should be removed.



Local slumps in cliffs (/0103C06)



Access ramp and steps (/0103C07)



Cracking in retaining wall to access steps and ramp (/0103C07)



Movement of deck slabs in access ramp (/0103C07)

As during the 2018 inspection, the cobble beach running from north of the access steps through the small pocket bay to the north of Seaham Harbour was high and the backing cliff was vegetated and appeared stable at the time of the inspection.

At the southern end of the bay there is a rock armour revetment which forms the link to the root of the North Pier of Seaham Harbour. Its function is to limit the risk of outflanking of the North Pier. The rock revetment is formed from armour of varying sizes. In the 2018 inspection a notable low spot was noted adjacent the mesh storage building where local erosion to the bank was apparent. The erosion did not appear to have worsened since then.



Stable cliff fronted by healthy cobble beach (/0103105)



Revetment preventing outflanking of the North Pier(/0104C02)



Low spot in revetment causing erosion to bank (/0104C02)

3.1.3 Seaham Harbour

Seaham Harbour is privately-owned by the Seaham Harbour Dock Company. The Council-supported £3m North Dock Regeneration Project, including a floating pontoon, lock gates and dock-side facilities, opened in early 2013.

Access to the North Pier is restricted by a locked access gate at the landward end. It is understood that access is restricted to manage angling rather than for safety concerns. The concrete deck shows cracking on the accessible sections, although the massive structure still clearly provides an effective coast protection function and is therefore assumed to be in fair overall condition.

Repointing repairs to previously-reported defects to the deck and both coping and upper sections of the inner face were noted beyond the access gate, but these could not be inspected in detail. The inner face was inspected from the beach at low tide and appeared unchanged from 2018, thus it remains in fair condition. It is recommended that, if not already in place, more detailed vessel-based and underwater inspections are undertaken by the Dock Company and if not already in progress a maintenance programme should be put in place.



Seaham Harbour North Pier Inner Face (0104C03)



Seaham Harbour North Pier Outer Face (0104C03)



Seaham Harbour North Pier Inner Face (0104C03)

The wall at the back of the beach in the outer harbour (0104C05) consists of two parts, the first being a vertical wall at the car park, which ties into North Pier, and the second a dressed masonry sloping revetment that ties into the breakwater to the south of the beach. As reported in 2018, there is vegetation growth in open joints in the revetment. The vegetation appears to be trapping sediment which is encouraging dune development. It is recommended that the open joints are filled if this sediment becomes removed. Sediment levels in the bay appeared significantly higher than the 2018 inspection and therefore concealed much of the revetment toe.



Vertical rear wall recently repointed (circa pre 2018) (/0104C05)



Open joints and vegetation growth on masonry revetment. High sediment levels (/0104C05)

The sections of the North Dock that can be inspected, do not appear to have deteriorated since the 2018 inspection. The inspection was further limited in 2020 as access onto the inner beach via the slip way was prevented. It is speculated this is due to the slipperiness of the ramp.

The walls around the North dock are in fair condition, but all have some open joints between masonry blocks in their faces and these would undoubtedly benefit from a routine maintenance programme involving re-pointing. In 2020, marine growth obscured large portions of the lower half of the assets. Assets 0104C04, 0104C06, 0104C11 and 0104C14 require only localised re-pointing, but assets 0104C09 and 0104C13 are in need of slightly more attention. The asset which needs the greatest attention in this regard, however, is 0104C12.



Inner Pier north face largely obscured by marine growth (/0104C06)



Loss of blocks and open joints (/0104C09)



Gaps between blocks at Seaham North Dock (/0104C12)



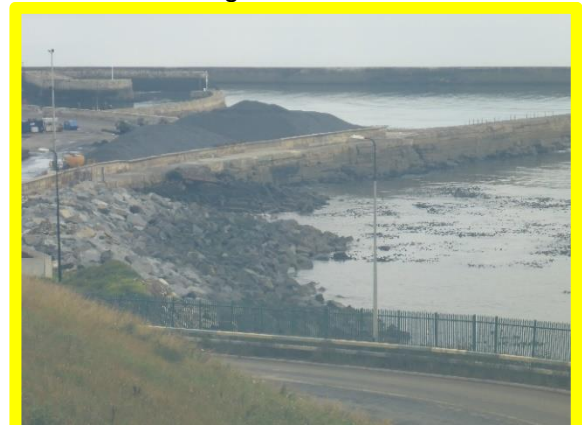
Inner face appeared in good to fair condition (/0104C10)

Access to South Pier and South Dock is prohibited due to port-related activity and the structures were only inspected from a distance. As reported in 2018, the South Pier appeared from afar to have significant damage to sections of the crest and outer face, particular apparent at the pier root outer face. An ununiform profile along this section potentially suggests settlement issues, although this did not look (from a far) to have worsened since the previous report.

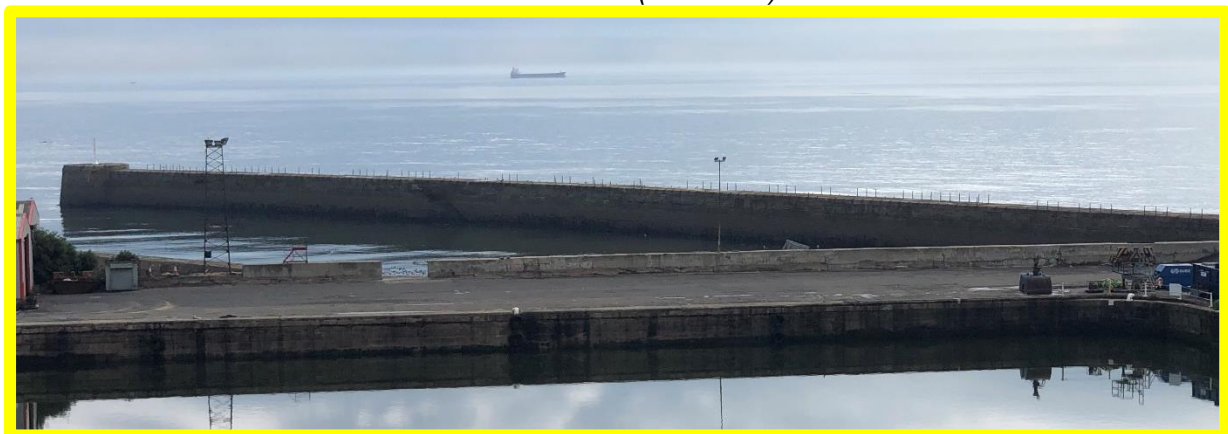
At the root of the pier, rock armour has been placed at the tie-in to the coast as part of a previous phase of regeneration. There is an area of tipped rubble in front of the rock armour. The armour continues to the south protecting the port access road and appeared to be in good condition. It is recommended a detailed inspection is carried out to assess the damage.



Seaham Harbour South Pier (/0104C17)



Tipped rubble (/0104C16) and rock revetment (/0104C01)



Seaham Harbour South Pier Inner Face (/0104C17)

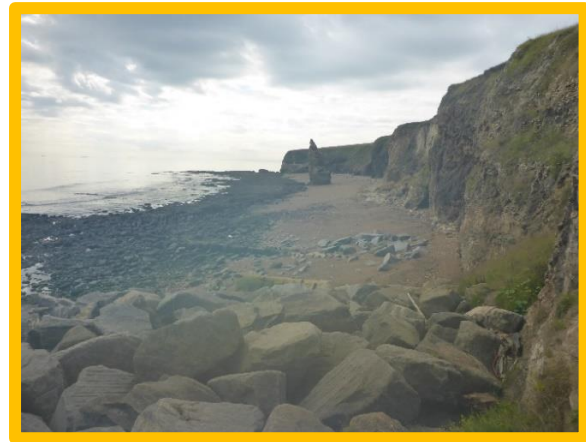
3.1.4 Dawdon

The frontage between Seaham Harbour's South Pier and Seaham Fleet Rock is protected by a continuation of the rock armour revetment extending southwards from the South Pier. In most places the armour is against the cliff toe, but where there is evidence of a former vertical wall, it is placed as a bund slightly seaward of the cliff. The rock armour is in good condition. There was some evidence of localised surface slumping in the vegetated slopes between the rock armour and the road.

South of the revetment between Seaham Fleet Rock and Nose's Point, the unprotected cliffs were previously fronted by a colliery spoil beach (known as Chemical Beach) but this has now been virtually completely eroded and there are an increasing number of local slumps in the backing cliffs, some of which consists of colliery waste. Debris exposed by the eroding beach should be removed routinely. The erosion appears greatest towards the south of Chemical Beach, just to the north of Nose's Point. No significant changes were observed along Chemical Beach since 2018.



Rock revetment from South Pier to Chemical Beach (/0105C01)



Little remaining spoil on beach (/0106C01)

3.1.5 Nose's Point and Blast Beach

At Nose's Point headland, the cliffs characteristically have caves and arches formed at their base. The headland appears relatively stable and exerts a control on both the Dawdon Chemical Beach frontage to its north and Blast Beach to the south.

To the south of Nose's Point is the bay of Blast Beach. The near vertical cliff line at the rear of the bay has been relict for many years as it is protected by an artificial beach formed of colliery spoil. The colliery waste was again noted in the 2020 inspection to be eroding and, as reported previously, has been almost totally lost at the south where it meets Chourdon Point. In future the limestone cliffs will become active again when the spoil beach has been washed-away, likely starting towards the informal steep access route at the south of the beach. At this point, formal beach access will have to be considered. The informal access had appeared to have eroded further, although not significantly, since 2018. It should be monitored closely.



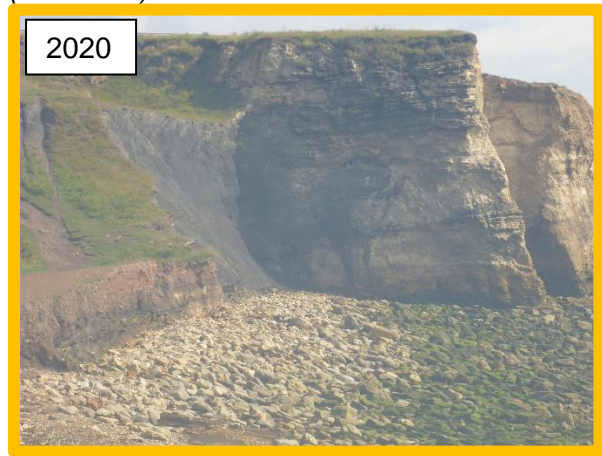
*Blast Beach – view looking south - 2018
(/0103C07)*



*Blast Beach – view looking south -2020
(/0103C07)*



*Erosion of informal beach access - 2018
(/0103C07)*



*Erosion of informal beach access -2020
(/0103C07)*



*Eroding colliery spoil on Blast Beach
(/0103C07)*

3.2 Chourdon Point to Blackhall Rocks (MA 10)

3.2.1 Chourdon Point

Unlike the cliffs to the north and south, Chourdon Point (0107C02) has no protection from the colliery spoil. Therefore, similarly to Nose's Point, there are caves, overhangs and arch formations at the base of the cliffs due to the weathering and erosion process. Chourdon Point can only be

inspected safely from the cliff top due to the marine covered, rocky foreshore around the headland. However, no significant changes were observed since the 2018 inspection.



South side of Chourdon Point (/0201C01)

3.2.2 Hawthorne Hive, Shippersea Bay and Easington Colliery

The coast between Chourdon Point in the north and Horden Point in the south (C0201C01) includes the bays of Hawthorne Hive and Shippersea. Although these bays did not directly receive colliery waste from direct tipping activities, they both accumulated significant quantities of waste from tipping areas further north. In general, this section of coastline has remained largely unchanged since the 2018 inspection, highlighted by the before and after photos below.



Residual spoil beach at Hawthorne Hive – 2018 (/0201C01)



Residual spoil beach at Hawthorne Hive – 2020 (/0201C01)



*Residual spoil at Shippersea Bay – 2018
(/0201C01)*



*Residual spoil at Shippersea Bay - 2020
(/0201C01)*



*Unnamed Bay fronting Easington Colliery -
2018 (/0201C01)*



*Unnamed Bay fronting Easington Colliery -
2020 (/0201C01)*

One particular area of concern is the section of cliffs to the north of the bay fronting Easington Colliery. Despite notable quantities of spoil waste remaining in the bay, the section of cliff between Shot Rock and Loom has continued to erode, with large slumping evident at the toe of the cliff. Furthermore, a large slip has occurred through the coastal footpath displacing the adjacent field fence. It is recommended that the footpath is diverted immediately, and the field fence reinstated.

In the sections of cliff which form headlands between the bays, there is typically cave and arch formation at their base, with local rockfalls occasionally occurring and slumping in the upper till layers. A notable large rock just north of Horden Point, in an area where there is no colliery spoil was reported in 2018 but no further activity was observed in 2020.

Access from the cliff top onto Shippersea Bay was heavily overgrown and appeared unsafe.



Cliff failure through coastal footpath (/0201C01)



Actively eroding section of cliff in between shot Rock and Loom. (/C0201C01)

3.2.3 Horden Denes

Between Horden Point and Blackhall Rocks there is a long uninterrupted length of colliery spoil beach (0201C02). This protects the backing cliffs from marine action, enabling them to become relatively stable and vegetated. As reported previously, the colliery waste is being continuously eroded. This is particularly noticeable to the north of the bay where it appears the colliery is eroding significantly faster, demonstrated by the cliffing, tension cracking and talus debris.

Despite the protection afforded by the foreshore and spoil beach, there remains occasional local shallow slumping in the backing slopes, especially in the centre of the frontage. In many locations there is debris on the beach such as old pipes and metalwork that is being exposed as the spoil erodes. There are also numerous car wreckages. These should be removed routinely to reduce health and safety hazards. The outfall structure encased in concrete, reported in 2018 to be in poor condition, has now failed with the lower section of pipe detached from the outfall. Any discharge will now be directly onto the foreshore.



Looking southwards from Horden Point (/0201C02)



Significant ongoing erosion to the colliery spoil to the North of the bay. Note – tension cracks and debris piles (/0201C02)



Northwards from Castle Eden Dene (/0201C02)



Minor erosion to colliery spoil to the south of the bay (/0201C02)

There are numerous watercourses that cross the foreshore along the frontage, it apparent that they are causing localised erosion through colliery spoil. The most significant is Castle Eden Dene, which is undercutting the toe of the slope behind as well as eroding a channel through the colliery spoil. During the 2020 inspection, which was carried out following a heavy rainfall event, the dene was impassible on the foreshore due to the volume of water.



Mouth of Castle Eden Dene eroding channel through foreshore and undercutting cliff toe. (/0202C02)



Failed section of concrete-encased outfall structure (/0201C01)

3.3 Blackhall Rocks to Heugh Breakwater (MA 11)

3.3.1 Blackhall Rocks and Crimdon Park Caravan Site

At Blackhall Rocks there is an extensive rocky outcrop on the foreshore, and the backing cliffs have extensive cave formations at their base.

The frontage south of Blackhall Rocks is protected by the rock scar outcrops on the foreshore. The cliffs are formed from softer material overlying a near vertical hard rock base. Numerous large-scale slumps of softer material were noted during the 2020 inspection. Rock falls from over-steepened/overhanging sections are evident locally. Fractures are visible in the rock indicating potential failure locations in the future. Near the north end of the caravan park, between the steep gill at the north of Crimdon Dene Caravan Park and the beach access steps within the park there are extensive cliff slumps and cliff failures. The access steps have been closed due to cliff falls in two locations. The fence appears to have been relocated landward in the region of the slip. As the cliff is expected to continue to erode the fence should be regularly relocated as required.

There is a notable lack of vegetation on the section of cliff to the north of the remaining access path suggesting that there is ongoing erosion activity in this area.



View south from Blackhall Rocks (/0301C01)



Unvegetated cliff adjacent to access pass (/0301C01)



Extensive Cave formation at Blackhall rocks (/0301C01)



Large-scale slump of softer material (/0301C01)



Large-scale slump of softer material (/0301C01)

3.3.2 Crimdon Park Caravan Site to Crimdon Beck

From Crimdon Park Caravan Site to the southern limit of Durham County Council's jurisdiction, at the boundary with Hartlepool Borough Council at Crimdon Beck. The beck diverts to the south as it enters the beach, causing erosion of the front face of the dunes within Hartlepool Borough Council's area.

The Durham frontage here comprises of extensive dunes. The profile of the dunes remained similar to previous surveys suggesting these remain relatively inactive. The dunes are generally in a healthy condition.

In one short length, the relict cliffing from a previous erosion episode was evident but this has now been almost fully restored by natural sand accumulation and the onset of embryo vegetation growth.

As in 2018, an area of stable upper beach immediately to the north of Crimdon Beck has fencing erected to safeguard Little Terns, which were again observed nesting during the inspection. Ringed Plover, Greenshank and Common Sandpiper are also at this location.



Stable dunes at Crimdon – nesting Little Terns in on the upper foreshore (/0301C02)

4. Comparison with Previous Assessment

The previous formal walkover inspections across the whole study frontage were undertaken in summer 2018. The frontage remains largely unchanged in overall condition grading and behaviour patterns since that time, with few major problems.

High beach levels along Seaham sea wall concealed a number of defects reports previously, including exposed reinforcement at the southern beach access ramp and the outflanking of the short concrete wall to the north. The damaged/missing flap valves remained.

Colliery spoil beaches along the frontage continue to erode landwards. It appeared the most erosion was occurring to the bay south of Horden Point. All the colliery spoils should be monitored closely to understand when the cliffs will start to re-activate.

A large slip failure has occurred through the coastal footpath between Shot Rock and Loom. This area of cliff appears to be particularly active. It is recommended that the footpath is diverted as soon as possible.

5. Problems Encountered and Uncertainty in Analysis

All assets were inspected at suitable stages of the tide and therefore there were no major problems encountered.

The assets around Seaham Harbour are privately owned by the Seaham Harbour Dock Company and access to North Pier, South Pier and South Dock in particular is prohibited due to port-related activity. Due to this several structures were only inspected from a distance. It is recommended that a programme of vessel-based inspections (and if necessary underwater inspections) is undertaken by the Seaham Harbour Dock Company to inform their ongoing maintenance and capital investment regimes.

Some localised sections of the cliff were only visible from the cliff top due to inaccessible foreshores, particular around Shippersea Point and Beacon Point.

6. Conclusions and Recommended Actions

Further to the visual inspection of all assets, specific conclusions and recommendations for individual assets are given in **Appendix B**.

All condition assessment data and selected photographs have been uploaded to SANDS (Shoreline And Nearshore Database System). This includes all data and photographs from the previous inspections since 2002 that were originally held on an MS Access Databases that had become obsolete.

Appendices

Appendix A

Asset Location Maps

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552000

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0 100 200 400 Metres

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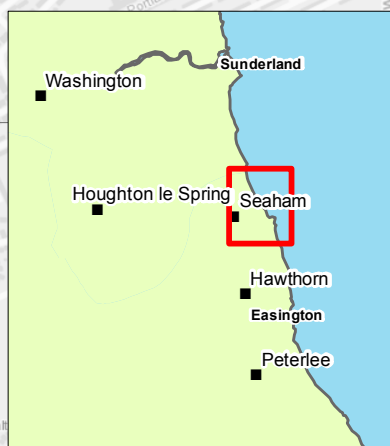
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Area covered by Map 1a

121AC901C0105C01

121AC901C0106C01

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Legend



-  Asset location
-  NFCDD Asset Number

Figure 1 - Map 1

Durham County Council Frontage

Asset Inspection Report

Drawing Scale 1:15,000 at A4

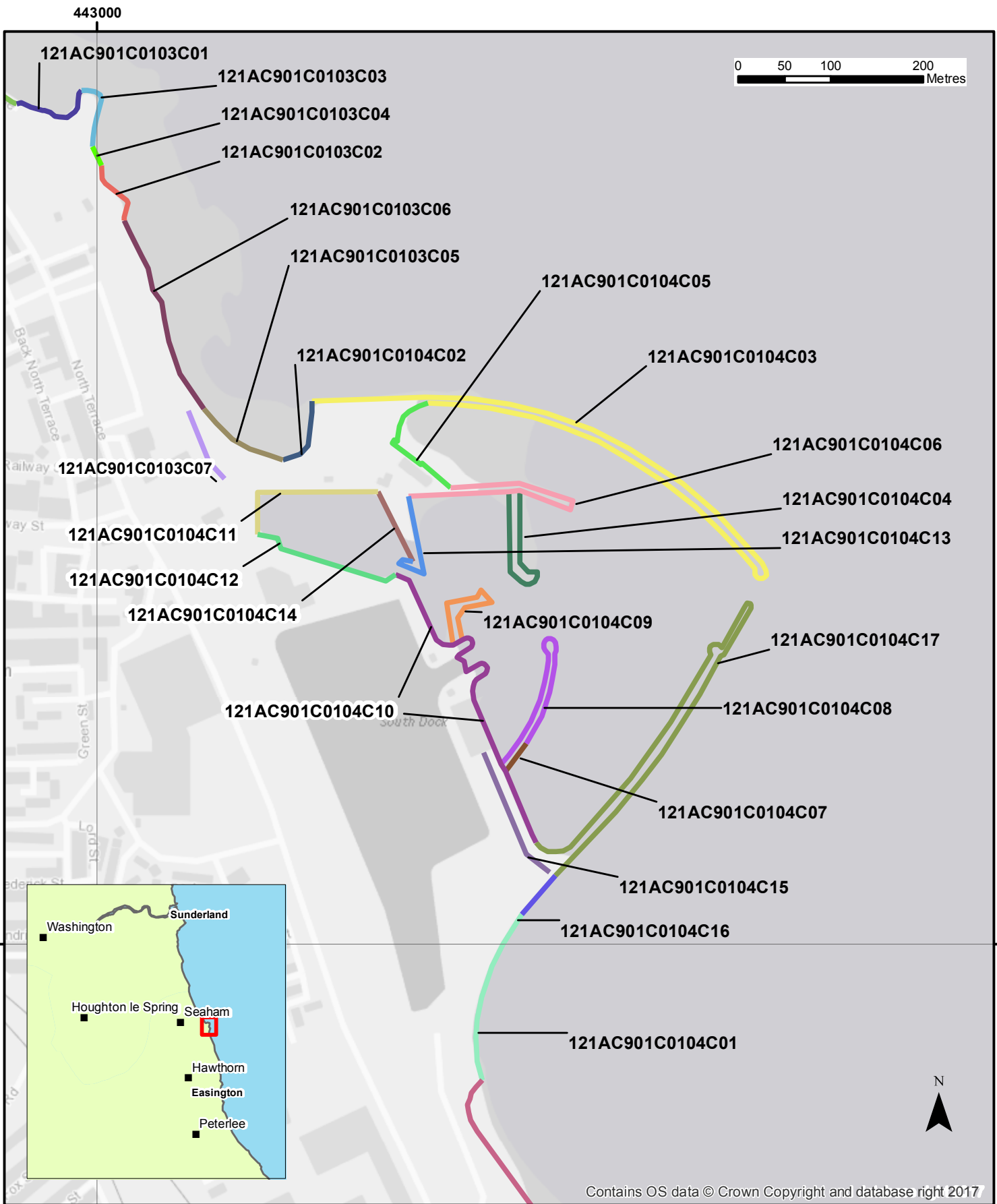
Client:
North East Coastal Group

Project:
Cell 1 Regional Coastal Monitoring Programme

WATER
Royal HaskoningDHV
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Fax: +44 (0)191 211 1313
www.royalhaskoning.com





Legend

Asset location

NFCDD Asset Number

Figure 1 - Map 1a

Durham County Council Frontage

Asset Inspection Report

Drawing Scale 1:15,000 at A4

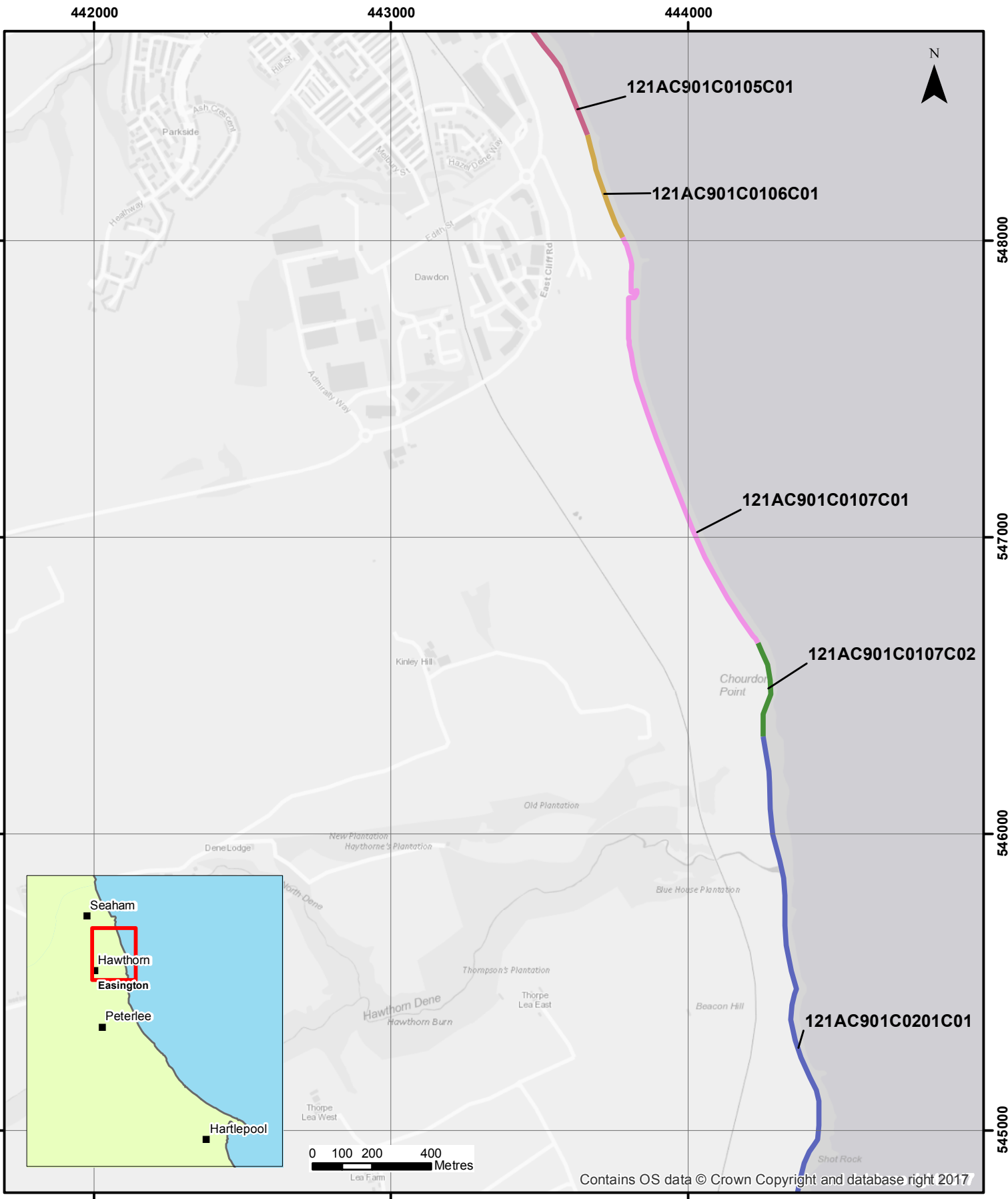
Client:
North East Coastal Group

Project:
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Royal HaskoningDHV
Enhancing Society Together



Legend

 Asset location


 NFCDD Asset Number

Figure 1 - Map 2

Durham County Council Frontage

Asset Inspection Report

Drawing Scale 1:15,000 at A4

Client:
North East Coastal Group

Project:
Cell 1 Regional Coastal Monitoring Programme

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Legend



-  Asset location
-  NFCDD Asset Number

Figure 1 - Map 3

Durham County Council Frontage

Asset Inspection Report

Drawing Scale 1:15,000 at A4

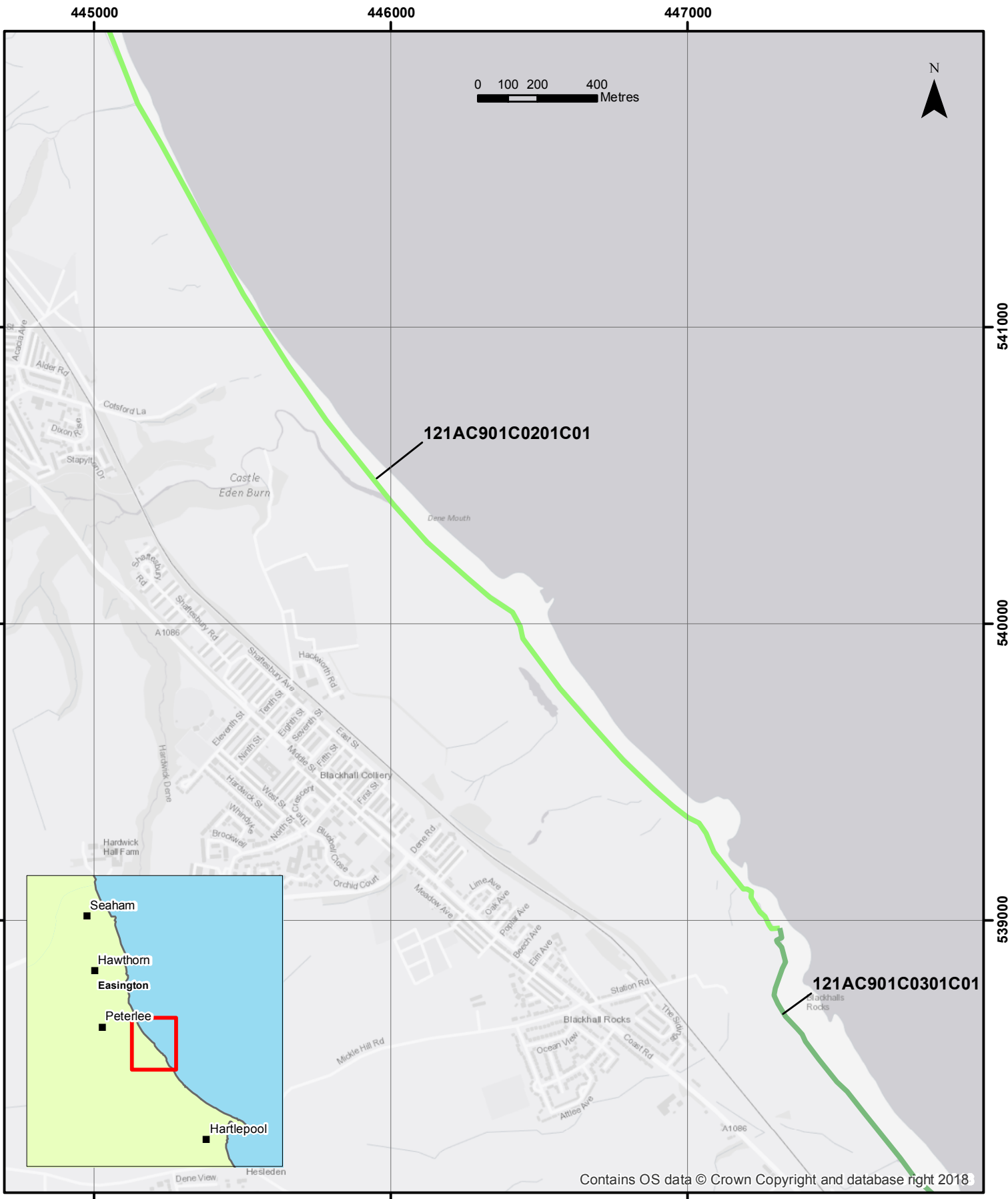
Client:
North East Coastal Group

Project:
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Legend



-  Asset location
-  NFCDD Asset Number

Figure 1 - Map 4

Durham County Council Frontage

Asset Inspection Report

Drawing Scale 1:15,000 at A4

Client:
North East Coastal Group

Project:
Cell 1 Regional Coastal Monitoring Programme

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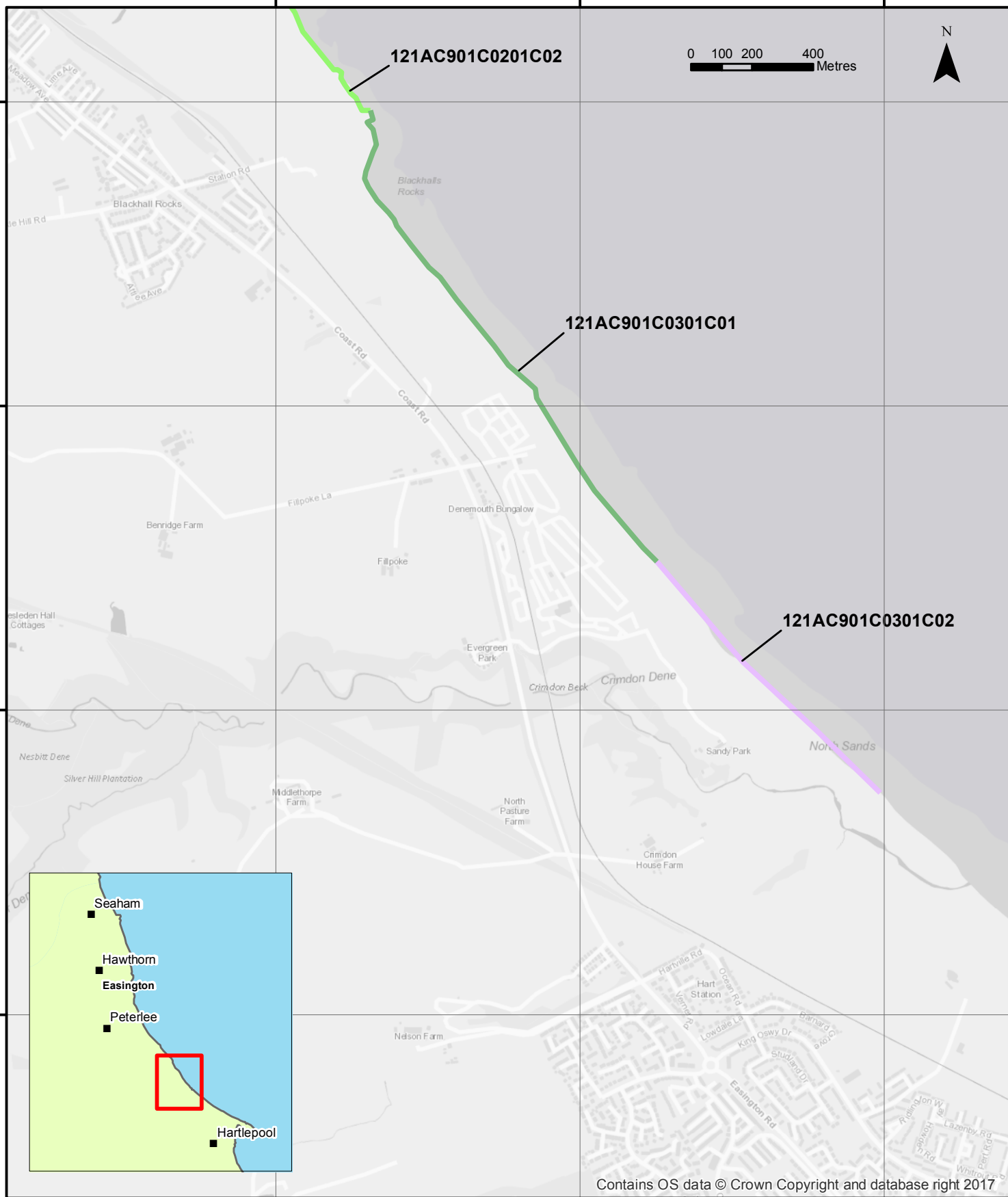


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Legend



-  Asset location
-  NFCDD Asset Number

Figure 1 - Map 5

Durham County Council Frontage

Asset Inspection Report

Drawing Scale 1:17,000 at A4

Client:
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Project:
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Appendix B Asset Condition & Recommendations

| Asset Name | Description | Type | Length | Inspection Date | Inspector | Comments | Overall Condition | Residual Life | Recommendations | Urgency |
|------------------|--|-----------------------------------|--------|-----------------|--------------------|--|-------------------|---------------|---|------------|
| 121AB901B0804C01 | Eroding cliff to agricultural land. | Cliff - south of Ryhope Dene | 1193 | 22/06/2020 | Royal HaskoningDHV | Small-scale but regular ongoing slumping in soft material that overlays the solid geology base. Occasional caves and arches formed at the base of the cliffs. Many recent mudslides / slips of upper cliff onto beach. | 3 | >20 | Continue monitoring. | no repairs |
| 121AC901C0102C01 | 680202. Seawall. Three individual lengths of sheet steel pile toe to main wall. Buried under beach no visual inspection. | Seaham seawall | 1098 | 22/06/2020 | Royal HaskoningDHV | Seawall in fair condition, deteriorating to the south. Abrasion damage evident in places. Many derelict groynes visible. Groyne piling on lower beach appears redundant (S end) poss H&S hazard. Abrasion damage at access ramp exposing reinforcement posing public safety risk. Concrete apron to the south in poor condition with sections missing and voiding visible beneath toe. | 3 | >20 | Review need for groynes and refurb or remove redundant groyne piling. At access ramp, trim protruding reinforcement and repair abrasion damage. | urgent |
| 121AC901C0103C01 | 680301. Rock berm. | Rock Revetment - Featherbed Rocks | 93.5 | 22/06/2020 | Royal HaskoningDHV | Rock armour berm/revetment extends around Featherbed Rocks. Armour in good condition. Some continued erosion of sea cliffs to south where berm is seaward of cliff toe. Some outflanking between concrete platform/cliffs to south of headland. | 3 | >20 | Monitor. | no repairs |
| 121AC901C0103C06 | Undefended over much of length, but some light protection by rock armour in north. | Cliff - Red Acre, Seaham | 223.3 | 22/06/2020 | Royal HaskoningDHV | Partly undefended, but is a 'transition zone' from rock armour to north to undefended bay. Cliffs in south well vegetated, but with signs of continued slumping. Erosion and slumping continue in north, with sheds / fence close to edge. | 3 | >20 | Public safety needs monitoring - access to cliff top controlled by fencing. | routine |

| Asset Name | Description | Type | Length | Inspection Date | Inspector | Comments | Overall Condition | Residual Life | Recommendations | Urgency |
|------------------|--|---------------------------------|--------|-----------------|--------------------|--|-------------------|---------------|---|------------|
| 121AC901C0103C03 | 680401 Concrete wall to base of eroding cliff. Very poor condition. Collapsed slab behind. | Wall | 78.6 | 22/06/2020 | Royal HaskoningDHV | Rock armour revetment constructed in front of cliff toe. Ongoing slow erosion of cliff behind through weathering. | 3 | 11 - 20 | Monitor cliff behind armour | no repairs |
| 121AC901C0103C04 | 680503 Gunnited rock toe to wall. Rock protection scheme under study. | Apron | 22.6 | 22/06/2020 | Royal HaskoningDHV | Rock armour protecting short length of wall with large outfall. Wall in fair condition, armour good. Damage to wall at S corner where returns toward eroding rock outcrop. Large cracks in wall face at N end. Low beach levels in 2020. | 3 | 11 - 20 | Monitor for outflanking. Repair cracks in crest wall. | routine |
| 121AC901C0103C02 | 680601 Concrete wall to base of eroding cliff. Rock protection at toe. | Wall | 72.6 | 22/06/2020 | Royal HaskoningDHV | Rock armour revetment in good condition, but erosion of cliff edge continues due to weathering. Fence and shed at cliff edge at high erosion risk, although not noted to have worsened in period between 2018 and 2020 | 3 | >20 | Monitor. | no repairs |
| 121AC901C0104C03 | 681002 Crest wall to river end of North Pier. Overtopping protection to pier and reclaimed land. | Wall | 986.3 | 19/08/2020 | Royal HaskoningDHV | Seaward face and crest not accessible. Inner face fair, evidence of repairs, which are holding. Some missing mortar and voids between masonry blocks. Structure is heavily overtopped at high tide. | 3 | >20 | Detailed inspection by Seaham Harbour Dock Company. | routine |
| 121AC901C0103C05 | High shingle/cobble beach at toe. | Cliff - Red Acre Point, Seaham | 103.9 | 22/06/2020 | Royal HaskoningDHV | High levels of pebble beach berm protecting cliff toe. Upper beach remains high but has steepened. | 2 | >20 | | no repairs |
| 121AC901C0104C02 | Rock armour slope to rear of harbour area reclaiming land. | Armour - Red Acre Point, Seaham | 80.7 | 22/06/2020 | Royal HaskoningDHV | Substantial rock armour sizes and stable profile of works. Some erosion of land at root, but not worsened since 2008. Low spot adjacent to mesh storage where local erosion to the bank noted, | 2 | 11 - 20 | Monitor. | no repairs |

| Asset Name | Description | Type | Length | Inspection Date | Inspector | Comments | Overall Condition | Residual Life | Recommendations | Urgency |
|------------------|--|-------------------------------|--------|-----------------|--------------------|--|-------------------|---------------|--|---------|
| 121AC901C0103C07 | Wall protecting access ramp with small retaining wall to slope to rear of ramp. | Wall - Red Acre Point, Seaham | 84.1 | 19/08/2020 | Royal HaskoningDHV | Diagonal cracking to seaward face of wall retaining access ramp/steps. Beach levels high. Minor cracking to retaining wall at toe of slope to rear of ramp. Local movement of ramp deck posing trip hazard, location of movement coincides with transition/cracks in rear wall. | 3 | 11 - 20 | Repairs to cracks. investigate cause of movement at ramp and repair accordingly. | urgent |
| 121AC901C0104C05 | 681501 Dressed masonry revetment slope in harbour. | Revetment | 146.5 | 19/08/2020 | Royal HaskoningDHV | Low vertical wall between beach and car park good. Sloping dressed masonry revetment has missing mortar between blocks and vegetation growth/ dune development in gaps. Uneven profile noted in slope of revetment which may be indicative of loss of fill. High beach levels in 2020 concealed much of the lower revetment. | 3 | >20 | Grout gaps between blocks in revetment. Monitor revetment profile for movement. | routine |
| 121AC901C0104C06 | 681601 Massive masonry breakwater. Vertical sided on southern side at landward end only. | Breakwater | 323.8 | 19/08/2020 | Royal HaskoningDHV | Only inspected from north side due to access restrictions. North side fair, some missing grout between masonry blocks. | 3 | >20 | Detailed inspection by Seaham Harbour Dock Company. | routine |
| 121AC901C0104C11 | 681802 Masonry retaining wall to high ground inshore. | Wall | 175 | 19/08/2020 | Royal HaskoningDHV | Some missing grout between masonry blocks. | 3 | >20 | Re-pointing to fill gaps. | routine |
| 121AC901C0104C12 | 681802 Masonry retaining wall to high ground inshore. | Wall | 164.2 | 19/08/2020 | Royal HaskoningDHV | Some missing grout between masonry blocks. | 4 | >20 | Detailed inspection by Seaham Harbour Dock Company. | routine |
| 121AC901C0104C14 | 681802 Masonry retaining wall to high ground inshore. | Wall | 84.2 | 19/08/2020 | Royal HaskoningDHV | Some missing grout between masonry blocks. | 3 | >20 | Re-pointing to fill gaps. | routine |
| 121AC901C0104C13 | 681901 Breakwater between north dock and outer harbour. | Breakwater | 132.8 | 19/08/2020 | Royal HaskoningDHV | Some missing grout between masonry blocks. | 3 | >20 | Re-pointing to fill gaps. | routine |

| Asset Name | Description | Type | Length | Inspection Date | Inspector | Comments | Overall Condition | Residual Life | Recommendations | Urgency |
|------------------|---|------------------------|--------|-----------------|--------------------|--|-------------------|---------------|---|------------|
| 121AC901C0104C04 | 681702 Masonry toe on seaward side only. | Apron | 231 | 19/08/2020 | Royal HaskoningDHV | Only viewed from Marina side due to access restrictions. Appears fair overall. Some missing mortar between masonry blocks. | 3 | >20 | Detailed inspection by Seaham Harbour Dock Company. | routine |
| 121AC901C0104C09 | 682101 Breakwater side slopes vary along length. Damage in parts. Some concrete bagwork repairs. | Breakwater | 172.6 | 19/08/2020 | Royal HaskoningDHV | Inspected on north face from North Dock only. Appeared in poor condition with missing blocks evident. Missing grout between blocks. | 4 | >20 | Re-pointing to fill gaps. | routine |
| 121AC901C0104C08 | 682201 Breakwater is pierced by regular holes at high tide level. | Breakwater | 277.6 | 19/08/2020 | Royal HaskoningDHV | Not inspected. | 0 | >20 | Detailed inspection by Seaham Harbour Dock Company. | routine |
| 121AC901C0104C07 | 682201 Breakwater is pierced by regular holes at high tide level. | Breakwater | 37.5 | 19/08/2020 | Royal HaskoningDHV | Not inspected. | 0 | >20 | Detailed inspection by Seaham Harbour Dock Company. | routine |
| 121AC901C0104C10 | 682001 Breakwater between seaham south harbour and outer breakwater. | Wall | 412.9 | 19/08/2020 | Royal HaskoningDHV | Appeared fair but only viewed from distance. | 3 | >20 | Detailed inspection by Seaham Harbour Dock Company. | routine |
| 121AC901C0104C15 | 682001 Breakwater between seaham south harbour and outer breakwater. | Wall | 150.6 | 19/08/2020 | Royal HaskoningDHV | Appeared fair but only viewed from distance. | 3 | >20 | Detailed inspection by Seaham Harbour Dock Company. | routine |
| 121AC901C0104C17 | 681101 South Pier to Harbour acting as protection to internal frontages. | Breakwater | 746.7 | 19/08/2020 | Royal HaskoningDHV | Only inspected from cliff due to access restrictions. | 3 | >20 | Detailed inspection by Seaham Harbour Dock Company. | routine |
| 121AC901C0104C01 | Root of South Pier with recurved splash wall set back from main wall. Protection against overtopping into South Dock. Rock armour protection to wall. | Wall - Seaham | 190.7 | 19/08/2020 | Royal HaskoningDHV | Only viewed from cliff due to access restrictions to port. Rock armour revetment appears to still be in good condition. | 2 | >20 | 2-yearly inspections. | routine |
| 121AC901C0104C16 | Root of South Pier with a recurved splash wall set back from main wall. Protection against overtopping into South Dock. | Wall - Seaham | 55.4 | 19/08/2020 | Royal HaskoningDHV | Only inspected from cliff due to access restrictions. Fronted by areas where rubble has been tipped on seaward side. | 3 | >20 | Detailed inspection by Seaham Harbour Dock Company. | routine |
| 121AC901C0105C01 | Eroding cliff to South of harbour within Dock Co. property. Derelict industrial land above. | Cliff / Scarp - Dawdon | 575 | 19/08/2020 | Royal HaskoningDHV | Rock armour in good condition. In the north armour is against the toe, further south there is also a bund set forward of cliffs at former wall remnants. Cliffs to rear are protected but still evidence of surface movement and slow erosion. | 2 | >20 | 2-yearly inspections. Monitor for outflanking at S end. | no repairs |

| Asset Name | Description | Type | Length | Inspection Date | Inspector | Comments | Overall Condition | Residual Life | Recommendations | Urgency |
|------------------|--|--|--------|-----------------|--------------------|--|-------------------|---------------|--|------------|
| 121AC901C0106C01 | Colliery spoil slope protecting cliffs. | Recharge - near Seahm Fleet Rock | 366.9 | 19/08/2020 | Royal HaskoningDHV | Colliery waste has now gone. Slowly eroding near vertical cliffs with little vegetation and occasional slumps in upper till. | 4 | 11 - 20 | Clear-up of debris as spoil erodes. Monitor rate of cliff recession. | routine |
| 121AC901C0107C01 | Spoil beach fronting now relict cliffs. | Recharge - north of Chourdon Point | 1513 | 19/08/2020 | Royal HaskoningDHV | Cliffing in colliery waste as it erodes back. Some local slumps and cracking in backing cliff. Colliery waste becoming narrow, esp at ends of bay. Erosion edge close to rear of pill box on beach at S of access steps. | 3 | >20 | Monitor rate of erosion of colliery spoil and the rate of cliff recession. | no repairs |
| 121AC901C0107C02 | Hard rock cliff with overlying till. Rock platform subject to chemical weathering. | Cliff - Chourdon Point | 327.8 | 19/08/2020 | Royal HaskoningDHV | Weathering of rock platform and slow erosion of cliffs, forming caves and arches. Unstable sections with caves and arches. Rockfalls at 'point' have left notable overhangs. | 3 | >20 | 2-yearly inspections. | no repairs |
| 121AC901C0201C01 | undefended | Cliff / Scarp - Chourdon Point to Horden Point | 3489 | 17/08/2020 | Royal HaskoningDHV | Generally localised slumping in softer material with arch/cave formation in base of harder rock. In some of the bays there is eroding colliery waste protecting the cliffs although in some locations only a narrow band remains. Large slip failure through coastal footpath and field boundary between Shot Rock and Loom. | 3 | >20 | Realing coastal footpath around slippage and reinsate fence. Monitor rate of erosion of colliery spoil and the rate of cliff recession. | Urgent |
| 121AC901C0201C02 | Colliery spoil protecting backing cliffs. | Recharge - Horden Point to Blackhalls Rock | 4913 | 17/08/2020 | Royal HaskoningDHV | Long uninterrupted length of eroding colliery spoil beach backed by cliffs. Occasional slumps in cliffs but good protection afforded by spoil beach except at headlands. Cliff in eroding beach about 1.5m high N of Blackhall, beach ridge at S end. Failed concrete encased outfall to the north. | 3 | >20 | Monitor rate of erosion of colliery spoil and the rate of cliff recession. Repair outfall. | routine |

| Asset Name | Description | Type | Length | Inspection Date | Inspector | Comments | Overall Condition | Residual Life | Recommendations | Urgency |
|------------------|-------------|--|--------|-----------------|--------------------|---|-------------------|---------------|---------------------------|------------|
| 121AC901C0301C01 | undefended | Cliff / Scarp - Blackhalls Rocks to Crimdon Caravan Park | 1846 | 17/08/2020 | Royal HaskoningDHV | Slumps in upper till evident along numerous sections of the caravan park frontage. Lack of vegetation to section adjacent to remaining access path suggests actively eroding. Main steps path to beach closed due to cliff falls. Steps at north end also closed. | 3 | >20 | Monitor erosion of cliff. | no repairs |
| 121AC901C0301C02 | undefended | Dunes fronted by sandy beach - south of Crimdon Caravan Park | 1056 | 17/08/2020 | Royal HaskoningDHV | Dunes and beach in front of and protecting cliffs. Dunes appear relatively stable and well vegetated. | 2 | >20 | Monitor changes to dunes. | no repairs |