ROYAL HASKONING

Cell 1 Regional Coastal Monitoring Programme
Coastal Walkover Inspections 2010

Northumberland County Council
Final Report

NORTHUMBERLAND
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Abbreviations and Acronyms

Acronym / Abbreviation	Definition
CAM	Condition Assessment Manual
NFCDD	National Flood and Coastal Defence Database

Asset Condition Grades

Grade	Condition Description
1	Very Good
2	Good
3	Fair
4	Poor
5	Very Poor

Glossary of Terms

Term	Definition
Beach nourishment	Artificial process of replenishing a beach with material from another source.
Berm crest	Ridge of sand or gravel deposited by wave action on the shore just above the normal high water mark.
Breaker zone	Area in the sea where the waves break.
Coastal squeeze	The reduction in habitat area which can arise if the natural landward migration of a habitat under sea level rise is prevented by the fixing of the high water mark, e.g. a sea wall.
Downdrift	Direction of alongshore movement of beach materials.
Ebb-tide	The falling tide, part of the tidal cycle between high water and the next low water.
Fetch	Length of water over which a given wind has blown that determines the size of the waves produced.
Flood-tide	Rising tide, part of the tidal cycle between low water and the next high water.
Foreshore	Zone between the high water and low water marks, also known as the inter-tidal zone.
Geomorphology	The branch of physical geography/geology which deals with the form of the Earth, the general configuration of its surface, the distribution of the land, water, etc.
Groyne	Shore protection structure built perpendicular to the shore; designed to trap sediment.
Mean High Water (MHW)	The average of all high waters observed over a sufficiently long period.
Mean Low Water (MLW)	The average of all low waters observed over a sufficiently long period.
Mean Sea Level (MSL)	Average height of the sea surface over a 19-year period.
Offshore zone	Extends from the low water mark to a water depth of about 15 m and is permanently covered with water.
Storm surge	A rise in the sea surface on an open coast, resulting from a storm.
Swell	Waves that have travelled out of the area in which they were generated.
Tidal prism	The volume of water within the estuary between the level of high and low tide, typically taken for mean spring tides.
Tide	Periodic rising and falling of large bodies of water resulting from the gravitational attraction of the moon and sun acting on the rotating earth.
Topography	Configuration of a surface including its relief and the position of its natural and man-made features.
Transgression	The landward movement of the shoreline in response to a rise in relative sea level.
Updrift	Direction opposite to the predominant movement of longshore transport.
Wave direction	Direction from which a wave approaches.
Wave refraction	Process by which the direction of approach of a wave changes as it moves into shallow water.

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 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.

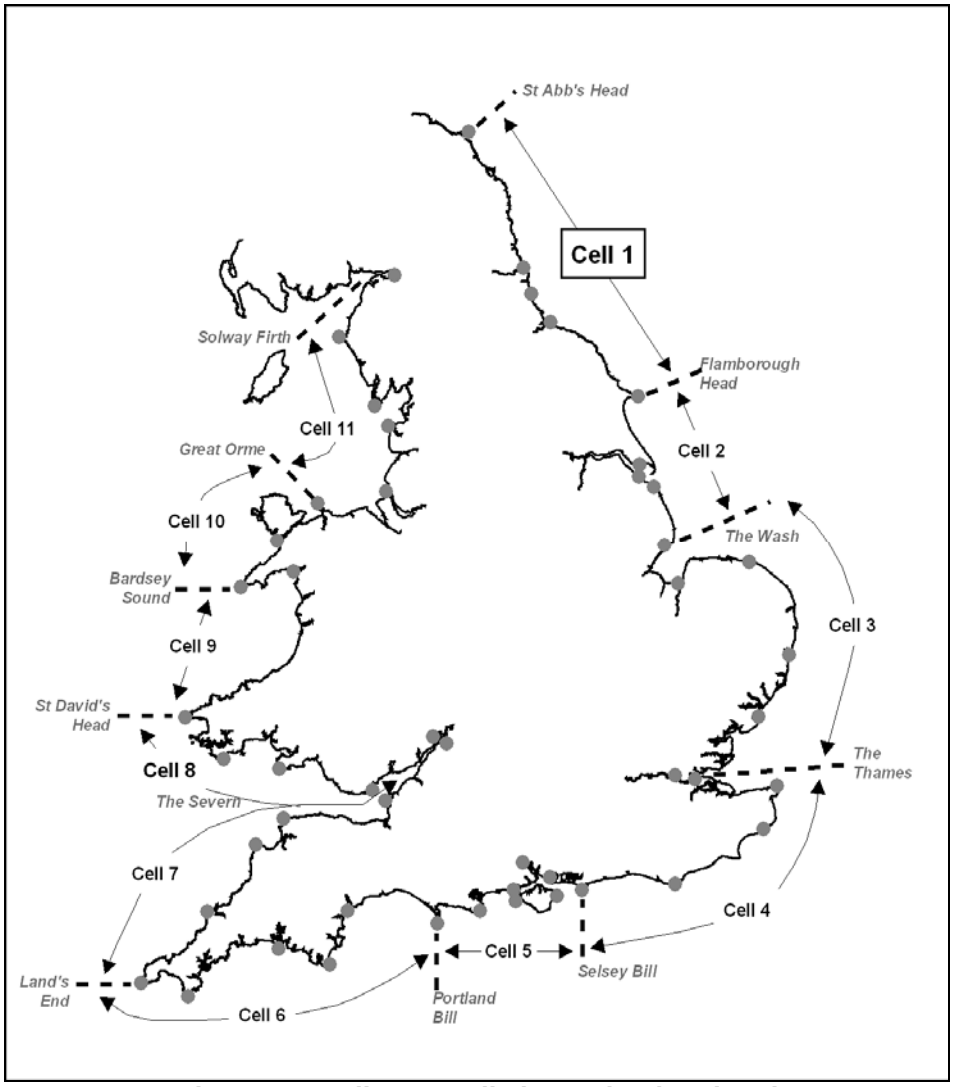


Figure 1 - Sediment Cells in England and Wales

The programme commenced in its present guise in September 2008 and is managed by Scarborough Borough Council on behalf of the North East Coastal Group. It is funded by the Environment Agency, working in partnership with the following organisations.

The data collection, analysis and reporting is being undertaken as a partnership between 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
- walk-over surveys

The present report is **Coastal Walkover Inspections 2010** and provides a summary of the main findings from the walkover inspections of Northumberland 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

Northumberland County Council's frontage extends from the Scottish Border in the north to Hartley in the south.

1.2 Methodology

The walkover inspections for the Northumberland County Council frontage were undertaken between June and August 2010. The weather experienced during the inspections was generally calm but sometimes wet, with occasional windy days. During the inspections along Cambois Bay to the Blyth East Pier a dense fog was present restricting visibility but defence assets could still be inspected from close range.

The frontage has been split into a number of 'asset lengths' (Appendix A), the location and numbering of which correlates with those defined in the National Flood and Coastal Defence Database (NFCDD) which is maintained by the Environment Agency. All maritime Local Authorities that act as Coast Protection Authorities have a duty to report findings from walkover inspections into the NFCDD.

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 in accordance with the Environment Agency's Condition Assessment Manual (CAM), with estimates made of their residual life and assessments made of the urgency of any necessary repair work.

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.

In addition to this report, all detailed inspection reports (including condition grading and residual life) and a selection of appropriate photographs have been entered into a Microsoft Asset database (provided to the Council) and transferred to NFCDD.

2. Overview

There have been significant changes in the condition of a number of the built and natural defence assets along the Northumberland frontage since the previous formal inspections in November 2008.

The winter of 2009/2010 was particularly harsh, with sub-zero temperatures for considerable durations and heavy snowfall and rainfall. Cycles of freeze-thaw within the rock cliffs would have weakened their structure in places, causing existing fissures to widen and perhaps creating new fissures. The thick layers of snow lying on the cliff top would then have placed increased loading on the surface and with marine action attacking the toe, especially during winter storms and high tides, failures were triggered in several locations. In one location, just to the north of Sandy Bay Caravan Park, such a collapse tragically led to the death of a sea angler who was night fishing from the cliff top.

In addition, the high tides during the spring equinox of March 2010 coincided with storm conditions, causing additional pressure on frontages, especially those composed of softer sediments such as sand dunes.

As a result of these weather and marine conditions, the following significant findings were observed during the 2010 inspections:

- **Marshall Meadows Bay** – Slumps in the softer overlying material have cut the cliff top back to the footpath in places, and large rock falls and fracturing in the harder rock have occurred close to the Caravan Park.

- **Green Haven's Breakwater** – The structure remains in poor condition and is likely to experience further failure of its crest due to cracking and voiding.

- **Magdelene Fields** – Local and occasional slumping in the upper softer material has occurred, including one area where recession has cut back to the fence posts

- **Tweed Breakwater** – Whilst important repairs have clearly been undertaken since the 2008 inspections towards the head, there is a void developing in the inner face of the structure which requires urgent attention.

- **Berwick Town Walls** – One fronting sloping revetment remains in poor condition at its western end, but has not visibly deteriorated significantly since the 2008 inspections.

- **Tweed South Bank** – The gabions running eastwards of Tweed Dock have broken in places, showing a further deterioration since the 2008 inspections.

- **Spittal Quay** – High beach levels have mostly masked the significant damage previously identified in 2008 to the masonry underneath the timber jetty, while some outflanking at the tie-in to the dunes is now occurring.

- **Spittal Dunes** – The dunes have actively eroded, linked to changes in position of the main estuary channel and evolution at Sandstel Point spit.

- **Spittal Point** – The foreshore has notably eroded but the revetment remains providing protection. The timber groynes along the frontage are effectively obsolete, and the gabions behind part of the revetment are missing or broken in some places and would benefit from replacement or maintenance.

- **Scremerston** – The cliffs have suffered a relatively large slippage in one area, but this does not presently threaten the railway line.

- **Cheswick and Goswick Sands** – Following quite significant winter storm damage, the dunes in places have started to show signs of recovery with some accretion and some embryonic dune development.

- **Beal** – One section of flood embankment has been modified to allow tidal inundation of the backing land via pipework as part of the Northumberland 4shores Project.

- **Holy Island** – Minor maintenance would benefit several structures, but the hexagonal netting used to stabilise the slopes near the castle need replacement and consideration could be given to extending the netting to slumping sections further eastwards.

- **Seahouses** – Undermining and voids in the Main Pier at North Sunderland Harbour need capital works with a high level of priority.

- **Beadnell** – There has been further deterioration of the main sea wall protecting access to the village despite crest wall repairs. There has also been gabion revetment damage which needs repair.

- **Boulmer** – Further local erosion has been responded to by tipping of material, including rubble, along the seaward face of the coastal margin.

- **Alnmouth** – Notable erosion has occurred along the dunes immediately north of the mouth of the River Aln estuary, with ongoing erosion of a lesser scale also occurring south of the mouth. Maintenance is needed to the masonry wall at Church Hill.

- **Warkworth Harbour** – The timber North Jetty is dilapidated and ineffective as a training wall. The seaward end of the North Pier has further fallen away from the main structure. Broomhill Quay experienced a failure soon after the previous (2008) inspections and remains un-repaired and in need of a capital scheme. There is erosion of the bank adjacent to the rock armour at the corner of the Little Shore Wave Basin, and poor condition sea walls within the Basin itself. The South Pier requires some routine maintenance to repairs cracks. Cliff House Sea Wall is deteriorating in condition through cracking near its crest.

- **Beacon Hill** – Dune erosion and blowouts have occurred, including undermining of a set of access steps which needs minor attention to ensure public safety.

- **Hauxley** – Erosion of rubble-strewn land behind the block revetment wall north of the Nature Reserve and erosion of the dunes, including of the lower peat layer, south of the Nature Reserve have occurred. In the latter area, the erosion has exposed fossilized tree stumps on the foreshore. The sand dunes have also cut back across the eroding lower peat layer.

- **Druridge Bay** – Widespread dune erosion occurred over the winter of 2009/2010 but many areas have subsequently stabilized or recovered. Ongoing ‘step-back’ erosion continues immediately south of the rock armoured sections near a car park and near the Boat Club slipway.

- **Creswell** – Tipping of construction rubble down the seaward face of the revetment was brought to the attention of Northumberland County Council planners. Extensive lengths of rockfall and fracturing of cliffs has occurred behind Stark Letch Rocks leading to slumping in the overlaying softer material.

- **Snab Point** – Cliffs to the north of Snab Point are active and the gabions are damaged and in places ineffective. One slump has cut back very close to the road edge. Two

large rock falls near the Point itself and erosion around this area has resulted in closure of the stepped access footpath.

- **Lynemouth Bay** – Local rock falls and soft cliff slumps have occurred in the north of the bay. There is active erosion of the spoil beach and spoil cliffs near Lynn Hill and again just south of the River Lyne. There is some ongoing erosion immediately south of the revetment protecting the Power Station.

- **Newbiggin Moor and Newbiggin Point** – Ongoing slumping of cliffs fronting the golf course and part of the Caravan Park. There are poor condition structures at Beacon End and Newbiggin Point, where the cliffs are also slumping and the soil netting is unravelling.

- **Hawks Cliff** – Occasional rock falls have triggered slumps in the overburdening till. The cliffs are highly fractured, leaving rock overhangs and likely ongoing future failures.

- **Cambois Bay** – Toe erosion and cliff-face slips have become very active near Cambois House and adjacent cottages. Erosion of the cliffs continues at the southern end of the foundry revetment and the northern end of the North Blyth revetment. The timber breastwork at Alcan's facilities is in poor condition and the sea wall connector to Blyth East Pier is in need of urgent attention.

- **Blyth South Beach** – The narrow band of dunes fronting the access to the Port of Blyth continues to experience toe cliffing. Where this is protected by gabions, they have split in many places and require replacement. The dunes along the central section of the bay remain susceptible to ongoing slumping.

- **Collywell Bay** – Minor maintenance to the cracks in the sea wall would be beneficial. There is also undermining at the toe of the wall's apron and outflanking at both ends of the access ramp.

3. Condition Assessment

3.1 Scottish Border to River Tweed Estuary

The cliffs that extend from the Scottish/English Border (below left) southwards to Marshall Meadows Point are relatively stable (below right).

At Marshall Meadows Bay, however, there are signs of more activity, with some slumping in the softer material which overlays the hard rock base. This has cut the cliff top back close to the footpath in a small number of places along the cliff section that extends north to Marshall Meadows Point. Also, directly at the Caravan Park, there are previous large rock falls (below left) and visible signs of fracturing in the rock directly in front of the building (below right). Some further rock falls are therefore anticipated.

The cliffs along St. John's Haven are highly stable as they are fronted by a wide rock platform which dissipates incoming wave energy (below left). The platform reduces in width at the cliffs which front the North Road Industrial Estate and as a consequence there are caves and arches (such as Needles Eye, below right) formed at their base. The geology of the cliffs provides a strong control on recession here, with only very occasional local rock falls noted, although one of the rock stacks was visibly fractured.

Along Magdelene Fields (north of Dodd's Well) the cliffs characteristically are susceptible to local and occasional slumping in the upper softer material. Relict slumps have cut the cliff top back locally to close to the footpath near the Golf Course. In the harder rock base, there are numerous caves, fissures and rock overhangs and there has been one recent local rockfall (below left). This ongoing erosion does not present a significant concern. Over geological time, the cliff in one place along this frontage has been breached and excavated along a weakness in its structure to form Brotherston's Hole (below right). There is notable cave formation at the base of the cliffs along this small cove.

Between Burgess' Cove and Sharpers' Head the hard rock base is highly fissured and some very local slumps have occurred in the softer overlaying cliff material, including some near the fenceline. There is a concrete pavilion structure and access steps (below left) and an outfall towards the southern end of this frontage and the outflow of Dodd's Well down the cliff face and across the foreshore to the north (below right). In the very north of the frontage there is a small recent rockfall and some cave formation in the base of the cliffs, as well as a dilapidated structure.

At Sharpers' Head there has been a recent, very local, rockfall and the cliffs from here south to the Green's Haven breakwater are characterised by large vertical fissures, caves at the base and local slumps in the overlaying softer material.

The Green's Haven breakwater itself is in a poor condition. The northern-facing (seaward) side is highly abraded and the crest is significantly damaged (below left). There is a void in the crest at the change in the structure's plan form alignment (below right) and extensive cracking nearby. It is likely that more of the crest will fail along the line of the existing cracking. The seaward end of the breakwater is extensively abraded and somewhat undermined. The southern-facing (haven) side is also highly abraded.

The cliffs to the south of the breakwater have two caves at the toe of the wooden (upper) and concrete (lower) access steps (below left). There has also been one rockfall and occasional slumps in the softer overlaying material along this cliff section, including one to the immediate north of the retaining wall to the access path (below right). There are various lengths of concrete apron and wall at the southern end of this frontage, but there are still occasional slumps in the cliffs behind.

Along the cliffs from Fisherman's Haven southwards to Meadow Haven there is evidence of recent slumps which have left the cliff top overhanging in places. Along one 10m length in particular the cliff top recession has cut back to the fence posts (below left). Elsewhere smaller local slumps are in evidence. The foreshore is characterised by swirling rock outcrops called Bucket Rocks (below right).

To the north of the Berwick Pier (breakwater) is a wide foreshore backed by generally healthy, well-vegetated and stable dunes (below left). Towards the north of this section, the dune edge starts to exhibit signs of erosion (below right).

3.2 Tweed North Bank

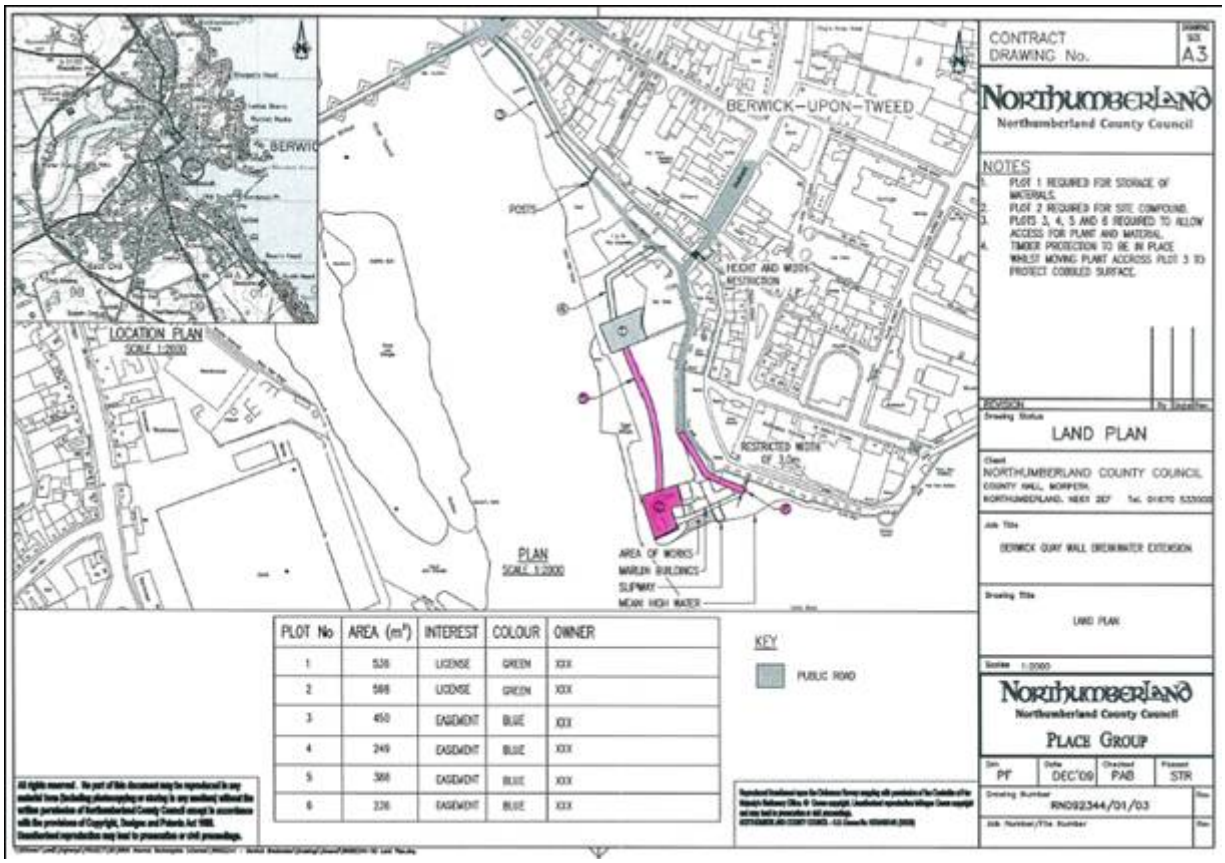
The north face of the main breakwater remains in good condition, although there local areas where a masonry apron has been constructed in the past and where there might be slight indications of outwash beneath the apron. This will need to be further monitored. The head of the breakwater has been repaired (below right) following the damage identified in 2008 (below left).

In general the deck and main inner face of the breakwater is in reasonable condition. There continues to be some spalling along the deck (below left). However, locally the inspection has identified a significant hole developing in the face of the breakwater and this requires urgent attention (below right). Reference should also be made to recommendations within the detailed inspection report under taken in 2008.

The section of seawall between the breakwater and the main walls has changed little although there is continuing damage to the old slipway. At the western end of this structure the revetment section is still in poor condition (below right). However, this has not deteriorated significantly since 2008 (below left).

The main town walls remain in relatively good condition with no significant change over the foreshore. Monitoring of the vertical crack in the main tower (below right) shows no movement and it is concluded that this is an old feature of the wall. It is noted from the description of the history of the walls that the early extension seaward of the tower in this area was endangered by the sea. Potentially the crack is associated with the subsequent modifications.

There are proposals (not yet constructed) by Northumberland County Council to extend the rock revetment to the slipway in front of Marlin Buildings (proposals shown below).



The existing defence in this area is in poor condition (below left). The short section of existing revetment further west does seem to have allowed accretion of sand (below right).

The main Berwick Quay wall appears in good condition although some of the older masonry sections will require further repointing. There some concern noted from 2008 that a local corner of the old wall showed signs of movement. The cracks in this area have not become worse (below right).

3.3 Tweed South Bank

Some minor repairs have been undertaken to the wall upstream of the road bridges. This has included improvement of the steps built out from the wall. There will be a continuing need to maintain this wall through repointing, although no immediate action is required.

South of Tweed Dock, the gabions used to protect the grassy sloping bank along Dock Road have, in places, broken with the stone now falling out (below left). Elsewhere the gabions appear to have settled and towards the eastern end are considerably damaged at the toe (below right). At the eastern-most end newer gabions have been placed at the toe to provide further protection, but similar work needs extending slightly further west. The deterioration of the gabions has continued from damage noted in 2008 and the long term management needs to be reviewed as highlighted by the SMP2.

Minor routine maintenance is needed to infill gaps in the low masonry wall (below left) to the east of the gabions, and to Spittal Pier (below right).

Routine maintenance would also benefit the masonry toe underneath the timber jetty at Spittal Quay, where some stones are missing (below left) and where there is some outflanking at the tie-in to the dunes (below right).

However, there has been a significant build up of sand at the downstream end (below right 2010, below left 2008). The revetment beneath the level of sand remains in a precarious state. The change along this section relates to the erosion pattern noted to the dunes further downstream and it suggests that the frontage does act as a controlling feature of this whole area. This needs to be considered as part of the current strategy being developed for the area.

The dunes at Spittal are actively eroding along their entire length and a suitable buffer zone should be allowed in any development proposals for this area to reflect this ongoing change. (below left 2008, below right 2010).

The headland defence at Spital has suffered significant erosion, by up to 2m in front of the revetment (below left 2008, below right 2010). The change in this area, while dramatic, is at present addressed by the revetment and similar changes have been experienced in the past.

The revetment running south of Spittal Point is in good condition, but the timber groynes are obsolete (below left) and some of the gabions above the revetment are broken. Where there are no gabions present, or where they are broken, the grassland above the revetment is eroding (below right). These gabions provide a useful filter to the back of the revetment and should be repaired or replaced through routine maintenance.

At the southern end of the revetment there has not been the same degree of erosion. The beach along Spittal Promenade remains quite healthy (below left) and the level of the beach is maintained through to the steps at the southern end of the promenade (below right).

To the south of the promenade there has been a significant local landslip (below left). This has exposed the underlying rock (below right). This tends to confirm the assessment made in the SMP2 that despite the underlying instability of the cliff in this area, the railway line is unlikely to be affected over the short to medium term and probably even in the long term.

3.4 Spittal to Beal

This section of the coast comprises lengths of dune interspersed with areas of rock outcrop and clay cliffs. The frontage has a history of periods of erosion and accretion. Different lengths of the coast respond differently to wave conditions. The east and northeast storms early in 2010 has resulted in local areas of erosion and generally in accretion towards the southern end of the frontage. Quite characteristic of the changes that have occurred, has been erosion of the upper dune and areas clay cliff, but with the foreshore being maintained at a relatively high, healthy level.

This is shown in the following series of photographs comparing 2008 (left) with 2010 (right).

South Scremerston: increased erosion of dune face with higher foreshore.

Slight erosion at the dune face, loss of upper beach but similar lower foreshore.

The Skeers: Slight erosion to the dune cliff line, increased exposure of shingle to the upper beach and similar levels over the lower foreshore.

Significant storm debris and high upper beach sand level, covering shingle, significantly greater erosion of the back dune.

Cheswick and Goswick: Over this frontage, through to the South Low, there has been a general increase in sediment over the low lying upper beach. This has allowed rapid development of embryo dune vegetation. This is further evidence of the area tending to be a sediment sink.

There is evidence of accretion up against the swath of salt marsh around the entrance to the South Low, but also local erosion of the dune line to the rear.

A new sluice has been constructed at South Low (below left), opening land behind to tidal flooding (below right) as part of the Northumberland 4shores project.

3.5 Holy Island

There remain no issues of immediate or significant concern at Holy Island. However, some minor changes have been noted since the 2008 walk-over inspections and some minor issues remain.

At the landward end of the causeway road at Chare Ends, just before it rounds a bend and approaches the main tourist car park on the island, there remains damage to the asphalt which has been placed to protect the roadside in an area where there is a lack of dissipative fronting marsh. Whilst some asphalt repairs have previously been made in this area, the situation is now slightly worse than was recorded in 2008.

The dunes that extend from the causeway road towards The Basin are mostly stable but have experienced minor toe erosion in one area (near the Natural England information board by the causeway road). The presence of vegetation on much of the cobble foreshore which fronts the dunes is indicative of the general stability here.

At The Basin, the sandstone cliffs seem less active than was observed in 2008, but several lengths are bare of vegetation and occasional slumps are in evidence. In one location cobble has been tipped down the cliff to provide a degree of protection. At the south-west corner of the main body of the island, the sandstone cliffs are relatively stable.

In front of the small church, the cobble berm previously recorded has been largely replaced by a sandy berm of similar height and width which appears stable. Some cobble does remain towards the south-east of this small bay. Whilst this is mostly vegetated and stable, some local erosion of the low dune above the berm has occurred close to a wooden bench. It may be necessary to re-locate the bench should this erosion continue.

The hard rock cliff that then extends towards the access ramp from The Heugh headland harbour pier remains highly fissured. For the first time since inspections began in 2002, a rock fall has been noted. A section of cliff has collapsed leaving multiple rock debris on the foreshore.

At the toe of the foreshore access ramp from The Heugh headland, there is a cobble berm on top of which sit three boathouses (two combined in one building and the other separate) and the distinct black shed named Maggie's Shed. The shed is becoming notably undermined and may need relocating. More significantly, however, there is the onset of outflanking at the southern end of the wall that protects the access ramp. This wall also has become increasingly undermined since 2008 (below left) and now requires maintenance. This is not presently a significant activity, but some missing masonry and voids should be infilled to avoid further deterioration. It is noted that this area has previously been repaired and some areas are holding up well. Other previous repairs, however, are themselves becoming undermined. During maintenance activities, attention could also be paid to more 'cosmetic' issues such as missing coping stones along the access ramp wall (below right).

In the softer material above the wall, some previous localised slumps are identifiable (below left). In one area along the access ramp, the softer material remains slightly overhanging and may therefore be subject to further slumping (below right).

Extending from The Heugh access ramp to Steel End, at the harbour pier, the hard rock cliff is once again highly fissured. In one location a single rock has fallen (below).

In the softer cliff material which in places mantles the harder rock base, occasional slumps are evident but these are localised and small scale. Towards the harbour pier, this has exposed some of the plastic matting previously used to aid stabilisation and vegetation growth.

Along the harbour pier and the trunk-wall leading to the pier, there are some gaps between the coping and the side-facing stones which need filling on the ‘inner’ side of the pier (below left). Along the pier there is also a slight gap opening between the coping and the pier deck (below right).

There is apparent lilting of the seaward end of the pier (below left) and a crack at the top of the fishermen’s steps on the inner side (below right) which both need continued monitoring for signs of worsening.

The areas of abrasion previously noted at the toe of the slipway were protected by a covering of large cobbles and boulders which have infilled the vulnerable areas.

Within the harbour itself, the sandy beach and dunes remain stable, with beach levels quite high at the time of the inspections. The broken hinge on the flap valve of the outfall in the centre of the beach has been repaired since 2008 (below left), but the obsolete outfall remains deteriorating (below right).

The section fronting the footpath that extends towards Lindisfarne Castle is eroding at its western end, although there remains a suitable buffer to the footpath. Some rubble has been placed to slow this process in the west (below left), but ongoing erosion here results in boulders being released onto the foreshore (below right).

With progression east, towards the castle, the frontage becomes much more stable, although there is some local slumping of the clifflet edge near the bus stop.

At the castle itself, the hexagonal netting does seem to have been highly effective in stabilising the soft cliffs which mantle the harder rock base, resulting in good vegetation cover and preventing slumping (below left). In places, however, the rock is now spilling out of the netting (below right) and this should be replaced if slumps are to be avoided.

During this maintenance, consideration should be given to extending the hexagonal netting further eastwards (to areas shown below) to reduce the slumping that continues in this area, although this has not particularly worsened since 2008 and presently does not cause a concern.

The 'ness' at Castle Point remains in a very healthy condition, with text-book examples of storm ridge formation (below left) and pebble barrier overwash fans (below right) exhibited.

The frontage between Castle Point and Emmanuel Head comprises soft cliffs fronted by rocky platforms, often with a cobble berm at the toe of the cliff, interspersed with lower areas fronted by more extensive cobble berms. Erosion of the cliffs throughout parts of this section remains ongoing, but at a relatively low rate through local slumps (below left). In one area fencing has been erected to keep the public away from the eroding cliff edge (below right), but no significant further erosion has been noted here since 2008 and the cliff face is well vegetated, indicating that some stability has been retained.

At Sanham, the dunes in the south and north of the bay are relatively stable due to the sheltering effect provided by Emmanuel Head and Castlehead Rocks, respectively (below left). In the centre of the bay, however, slumping remains active down the dune face (below right), although this is fairly modest and presents no risks to assets.

The metallic object observed in 2008 along the foreshore by Castlehead Rocks remains present (below left) and a further piece of metal debris was identified (below right). Checks should be made with the Nature Reserve Warden that they are aware of this and that it is not unexploded ordnance. A tall refrigerator was also observed along the foreshore here, which should be removed.

The hard rock cliffs at Nessend have experienced some local rockfalls which has destabilised the softer material from the cliffs above, but again this is local in scale and does not present a significant concern.

The dunes extending from Back Skeers around the island to Snook Point are high and relatively healthy, with only minor slumping locally occurring down occasional sections of dune face.

Between where the causeway meets the island and Chare End, where the road bends away towards the main tourist car park, the road carriageway is protected by a width of salt marsh and wide sand flats.

3.6 Beal to Budle Bay

From the landfall of the Holy Island causeway, near Beal, south to Fenham Burn, the shoreline is characterised by a good fronting width of salt marsh and mud and sand flats (below left). The marsh becomes narrower and patchier towards Fenham Mill, where there is a small timber retaining wall in front of the house (below right), before becoming wider again towards Fenham-le-Moor. The shoreline itself is comprised of a coastal slope which is not experiencing erosion.

East of the bird hide at Elwick, there is a flood embankment, fronted by salt marsh, which was not originally depicted in the National Flood and Coastal Defence Database (NFCDD). A new asset length has now therefore been created to cover the embankment. The embankment is protected along its toe by an asphalt and stone 'revetment' (below left) and currently is effective in preventing sea flooding to a local low-lying band of farmland across Ross. There are a few areas where routine maintenance would be of benefit to fill gaps between stones. Further along Cockly Knowes is a bracken-covered coastal slope leading to the Ross Links dunes. This is mostly stable, although there is one large blow-out at the coastal margin (below right).

The 'spit' of dunes along Old Law, extending seawards to Guile Point, were not previously included in NFCDD but now have been included as a new asset length. The inland-facing side of the spit is fronted by a cobble berm and is highly stable (below left). Two navigation beacons are present at Guile Point, one directly on the foreshore and the other on the dunes. The seaward side of the spit is more exposed to wave action and is actively experiencing storm-related erosion along its length (below right).

The dunes along Ross Back Sands (below) are very stable and are known to have been accreting historically. Within this, however, there is one area of about 10m in length and another of about 20m in length where toe erosion has occurred. The dunes extend around Ross Links towards Links End, where they are fronted by salt marsh and mud flat.

Various walls and mortared rock revetments (below left) extend around Links End towards the sluice at Ross Low (below right). These appear to remain in need of maintenance although their condition has not significantly deteriorated further since 2008.

Along the Chesterhill Slakes in Budle Bay, the salt marsh is generally healthy, although some salt pans (below left) and marsh edge erosion (below right) was noted. Generally, seaward of a distinct marsh edge cliff, the upper mud flat is colonised by *Spartina* (also shown below right). At the point where the shoreline turns westwards to head inland to Ross Low, loosely tipped rocks are present to offer some protection at this vulnerable point.

At Waren Mill (below left), the wall at the head of the bay is in poor condition but is not critical. The revetment fronting the road needs some minor maintenance to fill gaps between blocks (below right), although this has a low priority at present.

The southern side of Budle Bay is relatively healthy with no significant issues. The old jetty acts to control the sediment along the frontage (below right). There has been some growth in the spit from this southern side (below left) and this forms an outline shoreline to the bay.

3.7 Harkess to Seahouses

There has been some erosion at the dune face over this area but generally beach levels are high and the frontage is relatively stable.

Bamburgh: local erosion to the backshore but beach levels high (below left 2008, below right 2010).

Monks House: general erosion to the dune but beach levels remain stable (below left 2008, below right 2010).

There has been little significant erosion north of Seahouses (below left). The road wall is still in reasonable condition. There are coping stones loose and these need to be repaired to maintain the integrity of the wall (below right)

3.8 North Sunderland Harbour

There have been no obvious changes to the assets to the north of North Sunderland Harbour. The rock armour at the root of the Main Pier is now in place and is in good condition. It is reported to be significantly reducing the localised wave energy and overtopping.

Detailed inspections carried out in 2010 by Royal Haskoning for Northumberland County Council along the Main Pier have identified some very significant defects with the structure. A number of scour holes (below left) have been located along both the seaward face and the inner face and it is believed that the core of the structure is being lost via these scour holes. Intrusive investigations have discovered voids existing between the deck and the core material that should be supporting the deck. This has resulted in settlement and cracking of the deck. A significant amount of material (in places over 500mm) has also been lost from the face of the pier walls due to abrasion and general degradation of concrete (below right). Concrete strength tests have indicated that the strength of the concrete, especially on the inner face is extremely poor. Tests also confirmed the remaining thickness of the structure walls varies from in excess of 3m to as little as 0.6m and in one area divers reported the wall sounding 'hollow'. The concrete has become very porous and in one location water can be viewed seeping from the structure at a significant rate.

A full options appraisal report has been produced for Northumberland County Council and the recommendations of the report are that the pier walls should be encased, with increased protection also provided at the toe. It is proposed that the deck is removed and the core material excavated to investigate whether there are any voids at depth and then the structure backfilled and a new deck cast.

Work was on-going during the last inspection (in 2008) to the Outer Breakwater (below left) and to local walls to the back of the harbour below the work sheds on Harbour Road (below right). These works are now fully completed and the structures are now in good condition and providing increased protection to the Harbour.

North Sunderland Harbour Commissioners are in the process of applying for permission to install rock armour on the beach between the Main Pier and the Inner Arm. This purpose of this is to reduce the wave reflections inside the harbour and protect the back wall from further erosion. Currently a void is opening up in the face of the wall (below).

To the south of Seahouses there has been further local erosion to the dune line in the area of the golf course. While the main dune line has suffered slightly, more severe erosion has occurred in the corner between the dunes and the cliff line that runs seaward (below right). It is noteworthy that the thin ridge making up this cliff suffered very little erosion (below left). This seems to confirm the specific nature of the storms that hit the area earlier in the year. Waves will have tended to run along the cliff face, rather than against it, and more directly against the main alignment of the dunes. Where the two frontages meet the waves would be concentrated into the corner. As with other areas of the coast, the general foreshore level has not been significantly reduced. Any further defence of the frontage could be counter to the intent set out in the SMP.

3.9 Beadnell and Beadnell Bay

Some additional defence seems to have been undertaken to properties to the north of Beadnell (below left). This has been carried out in a haphazard manner, including use of building rubble (below right). This does not provide a secure defence of the frontage and should be improved. It is understood that this is private defences.

The main bay to the village has suffered significant overtopping, with damage to the road and further deterioration to the main sea wall. Some pointing and repair has been undertaken to the crest wall on the landward side (below left). However, this does not address the more serious deterioration of the seaward side of the wall (below right). There is need for repointing and concern now over general undermining and potential loss of the concrete toe works.

Further south, the gabion revetment has suffered further damage and is in need of repair (below). This frontage and that above are linked in terms of access to the village and harbour and it may be sensible to undertake a review of defence needs as a strategy.

The harbour works are in reasonable condition and maintain the protection to the dunes in the north of Beadnell Bay. There has been local erosion to the dunes by the entrance to the car park and recreational area (below left). There has been little significant erosion elsewhere around the bay (below right).

3.10 Low Newton to Boulmer

Despite erosion to the face of the dunes, there has been little set back of the toe to the frontage to the south of Low Newton (below left 2008, right 2010).

There is further evidence of erosion around other areas of Embleton Bay but no action would be required.

There has been no significant change at Craster. Along the outer face of the South Pier, there is very minor abrasion and undercutting (below). This will be monitored but no action is required at this time.

At Boulmer there has been some further erosion to the village frontage and the local response has been to tip material on the face of the bank (below). This provides little protection. An outline strategy has been developed for the frontage and further consideration should be given to implementing the recommendations to improve management in the area.

3.11 Alnmouth Bay

At Foxton Bay, the cliff line continues to show signs of slippage although there has been no significant erosion at the toe and in comparison to the inspection in 2008 the beach level has risen (comparison at access steps and along the cliff shown below; left 2008, right 2010). It is recognised that the beach in this area can change in level depending on specific wave conditions.

Over the northern section of the Alnmouth frontage, beach levels remain high, with the groynes largely buried (below left). The bank vegetation works also remain healthy and there has been little change along the car park frontage (below right). The access management works have reduced damage to the vegetated dunes and have increased resilience to the frontage despite the recent storms. This management would not provide substantially greater protection in the event of a major storm.

It is also noted that the coast to the south has suffered significant erosion (below left 2008, right 2009). This has reduced the width of new dune growth seen over the last 6 years, but has not cut back as far as the old eroding dune line of the 1990s. Again dune access management may have helped retain new dune width. There is the possibility that the erosion may have altered the alignment of the Aln and this may result in changes further north along the frontage. These potential changes will be monitored and picking up how the overall system now response will be important in understanding the long term behaviour of the whole frontage. The erosion to the north of the estuary is matched by erosion to the northern end of the dunes to the south (discussed below).

Some of the eroded sand from the open coast has been taken into the mouth of the estuary and beach levels are healthy to either side of the entrance channel (right).

There has been little change to the walls within the estuary. There is still some concern over the cracking and lack of pointing to the corner of the pathway wall (below left) and the wall through to the road bridge may still suffer damage, despite recent repairs (below right).

The affect of flooding is seen to the area where defences have been removed to the northern side of the inner estuary as part of the Northmberland 4 shores project (below) and this will continue to be monitored.

3.12 Church Hill and Alnmouth Dunes

The low masonry wall at the toe of Church Hill is in poor condition with several major full-height cracks along mortar joints (below left) and one area of missing blocks (below right), which looks set to worsen further. This wall would benefit from some maintenance to prevent further unravelling and local collapse which could lead to localised erosion of the backing slope.

Dunes along the south bank of the River Aln (below left) and further south towards Birling Carrs (below right) have suffered from some slumping on their face despite the quite frequent presence of concrete anti-tank blocks. These blocks are becoming abraded and on some of them reinforcement bars are starting to protrude.

3.13 Birling Carrs

Immediately in the lee of the rocky outcrops at Birling Carrs (below left), the backing dunes or slopes are somewhat more stable. The hard rock that outcrops in places at the base of the coastal slope has suffered from local rockfalls and very minor slumping behind (below right).

3.14 Warkworth Dunes

South of Birling Carrs, the dunes again are suffering from slumping (below left), although on a lesser scale to those located further north. However, with progression south, towards Warkworth Harbour's North Pier, the dunes become much more stable (below right) and the beach widths greater as sand is trapped from migrating alongshore by this major harbour structure.

3.15 Warkworth Harbour

3.15.1 North Jetty and North Wave Basin

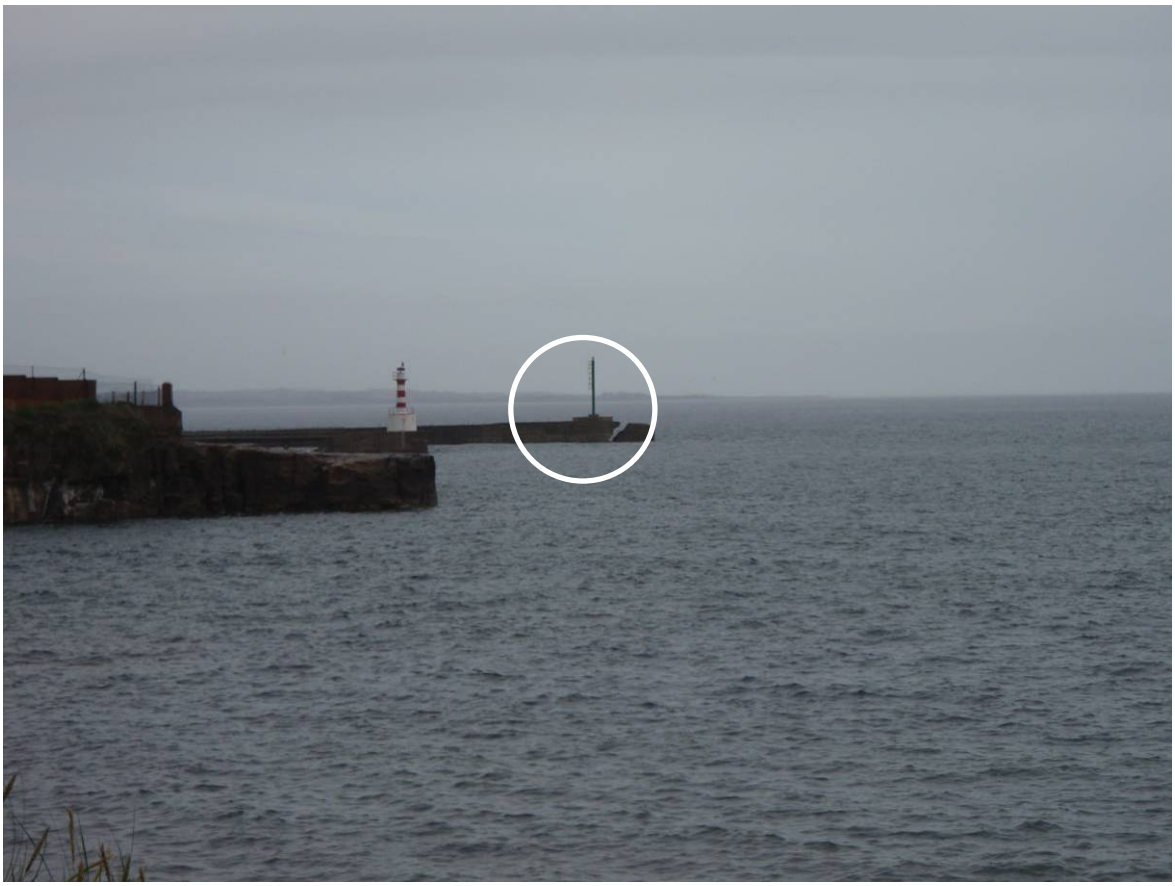
The North Jetty at Warkworth Harbour remains in a dilapidated state (below left) and is fairly ineffective as a river training structure since a bar of sand has built up adjacent to the jetty, pushing the river channel towards the southern bank. The northern Wave Basin continues to posses a healthy beach and stable backing dune system (below right).

3.15.2 North Pier

The rock revetment connecting the inner-facing root of the North Pier to the northern Wave Basin remains in fair condition (below left). This is also the case for the rock revetment at the landward end of the pier itself on both the inner-facing and seaward-facing sides of the pier (below right).

The central section of pier comprises a sloping blockwork face which has a few gaps on the inner face (below left) and some signs of damage on the outer face (below right) but generally is in good condition. The concrete deck of the pier has some minor cracks along this section. The seaward-facing side is heavily armoured with rock.

The seaward end of the North Pier remains in very poor condition. There is extensive abrasion of the concrete areas, including the deck (below left), and it appears that the cracked tip of the pier has fallen further away from the main structure, widening the gap at this end (below right).

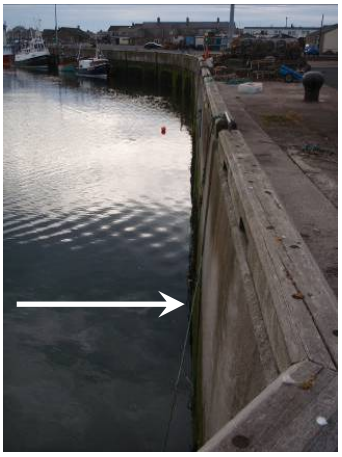


The superstructure to the navigation beacon has (presumably) been removed since the 2008 inspections to prevent it falling into the sea as the end of the pier worsens in condition (below).

3.15.3 Amble Quayside

Subsequent to the 2008 walk-over inspections, part of Broomhill Quay failed during a period of intense rainfall and high river flows in September 2008 (below). This was caused by the high currents in the river channel causing undermining of the quay and subsequently washing-out the core fill material, leading to settlement, deck cracking, voiding and collapse in areas. The failed section of quay is now closed to public access and a capital investment is needed to improve the situation. Investigations have been undertaken to consider creating a new dock in the damaged area to provide a catalyst for regeneration of the quayside, rather than simply repairing on a like-for-like basis. The remaining unaffected section of quay has been re-designed to allow continued public access and fishing use.

Of some concern is some apparent (presently slight) bulging in the seaward face of the quayside further upstream along the south bank (below left), between the dock and the lifeboat station, where a small hole has opened in the deck (below right). This area should be considered further from the river using a vessel-based survey at an appropriate stage of the tide.



At the eastern end of the failed section of quayside, a new timber linkspan bridge has been erected to enable continued public access to the South Jetty (below left). A section underneath the new timber linkspan bridge remains exposed and vulnerable to outflanking, with undercutting of the failed section of quay deck now also observed. The previously-observed outflanking of the rock revetment here (placed to protect the corner of the amenity land against erosion) has been addressed by the infilling and protection of eroded land with tipped rubble, tipped soil and a small section of poured concrete (below right), which not only looks unsightly but has also simply deflected the outflanking problem further into the Little Shore Wave Basin. The timber South Jetty itself remains in a good condition and the half-tide barrier remains effective in retaining water during the ebbing tide.

3.15.4 Little Shore Wave Basin

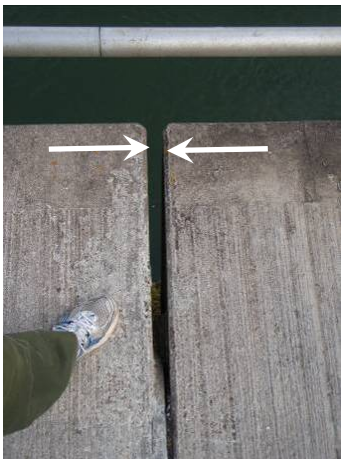
Within the Little Shore Wave Basin, some minor maintenance repairs are required to the small masonry wall at the rear of the dunes along the Harbour Road shore (below left), but more significantly, wide vertical cracks, occasional undermining due to loss of 'plumb' stones (below right), and cracking in the capping beam need attention along the sea wall fronting Bay View.

This sea wall becomes further deteriorated in condition towards its north-eastern end where large horizontal cracking is evident and the access ramp fronting the Castaway Café is dilapidated with a large void present, which presents a public safety hazard.

3.15.5 South Pier and Pier Head

The inner facing section of the South Pier appears in fair condition along most of its length (below left), although there remain unaddressed local problems with abrasion and cracking at the junctions where the structure joins both the Bay View sea wall and the South Jetty (below right).

The South Pier Head is not open to public access, but appears highly abraded (especially at the access steps to the lighthouse; below left) and at the landward end there are large gaps between concrete blocks (below right). At the seaward-facing junction with the South Pier, there is extensive abrasion and cracking in the structure which requires maintenance attention.

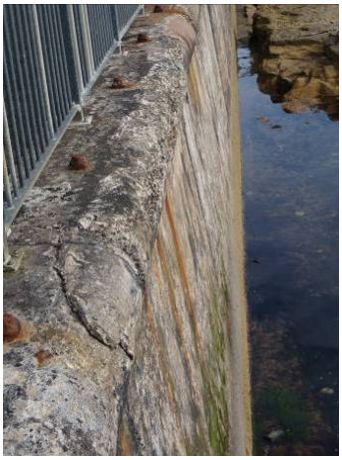


The seaward face of the South Pier appears generally fair in condition, although the concrete stub groyne is highly abraded (below left) and there is frequent evidence of cracking in the seaward face of the Pier towards its southern end, and then further along the adjacent short length of sea wall which extends to Pan Point (below right), which requires maintenance attention.

3.16 Pan Point to Beacon Hill

The concrete wall protecting Cliff House at Pan Point has deteriorated in condition since 2008, with numerous cracks throughout (below left), some of which expose corroded and broken reinforcement bars, and toe undermining still observed at the western end (below right). The access steps are also dilapidated and present a public safety hazard. These defects could be addressed through targeted maintenance.

The seawall fronting the children's play area is in overall fair condition, although some minor unravelling of the tarmac on the promenade (below left) and some abrasion of the wave return wall at the southern end (below right), where previous patch repairs had been made, were noted.



Along Amble Links the dunes appear to have recently been slightly more active than they were in 2008, with minor slumping in areas unprotected by rocky shore platform or hard rock cliff base, although the northern section remains stable. There was evidence of fly-tipping of rubble down the seaward face in one area (below left). The concrete sea wall encasement around the Island View headland (completed in 2003) is still in good condition, although there is a gap at one construction joint (below right) and there remains erosion to both the north and south where rock armour has been placed over short lengths.

The severe winter of 2009/2010 has caused some minor change along the low vegetated cliffs, causing local slumping and leaving overhangs and cracks in the softer material (below left) that are likely to lead to future further minor slumps. The outfall structure remains in a dilapidated condition ideally requiring either removal or repair (below right), although the dunes extending south to Wellhaugh Point remain stable.

The short, low, masonry wall backed by a rock revetment and the cliffs at Wellhaugh Point remain in good condition, but the dunes extending between Wellhaugh Point and Beacon Hill experienced notable erosion. In the northern-most section of dunes, this has exposed underlying clay at the toe of the dunes along a reasonable length of frontage, often creating distinct 'clifflet' in the clay (below left). There is damage, through erosion, to an access boardwalk towards the north of this frontage which presents a public safety hazard (below right).

Immediately south of the damaged access boardwalk, the dunes reach their greatest height. Along this section the dune face has experienced slumping and recession to the crest (below left). Rubble has been released down the dune face through this erosion, including bricks and the remnants of a dilapidated structure (below right).

The dune crest level then dips with southwards progression and rises again just to the north of Beacon Hill. In this section of dune, the entire seaward face has been recently active, revealing several fossilised tree stumps on the foreshore (below).

Further south still, near Beacon Hill, the dunes become more stable and well vegetated, with a cobble berm formed at their toe offering protection. The highly rusted outfall structure remains in need of repair or removal (below left), while the gabions by the access steps are become slightly deformed (although they remain intact and functional; below right). To the immediate south of these access steps is a large dune blow-out (also below right).

3.17 Hauxley

South of Beacon Hill, there is a section of rock armour, somewhat informally placed, that appears to have mostly stabilised the backing vegetated cliff, although one small section of minor movement in the cliff was noted (below left). Where the cliff then cuts back at the southern end of the revetment, some rock, stone and brickwork has been placed (below right), presumably to counter potential outflanking of the revetment. More rubble has been tipped further south still, prior to the frontage where the dunes naturally become more stable once again. Overall this frontage is less active than was observed in 2008.

The northern section of rock revetment fronting Low Hauxley (south to the access ramp) remains in fair condition (below left). The wider revetment south of the access ramp remains in good condition (below right), with less evidence of fly-tipping than was recorded in 2008 (although two patches of rubble remain at the southern end). A rusted bicycle frame has become lodged in the revetment by marine action.

The 'wall' made from large concrete blocks, located just to the north of Hauxley Nature Reserve, has large gaps between blocks where mortar is missing (below left) and at the southern end has considerable block displacement (below right). Despite these defects, which have been present for many years, the wall is still holding.

There does, however, seem to have been notable erosion of the rubble-strewn land behind the wall, presumably caused by storm wave overtopping of the wall (below).

The outfall along the shore at the northern boundary of Hauxley Nature Reserve is in a poor condition, with undermining and concrete damage, especially around the southern side and head (below left). There is then ongoing active, but small-scale, slumping throughout the length of dunes southwards to Bondi Carrs (below right).

Along the dunes at the southern end of Hauxley Nature Reserve, erosion of the lower peat layer has occurred, leaving clumps deposited on the foreshore (below left) and exposing fossilised three stumps in five separate areas (below right). The dunes have then cut back landwards across this underlying peat base, with many areas of slumping and oversteepening of the remaining dune face. This frontage has clearly suffered notable erosion since the 2008 inspections.

3.18 Druridge Bay

The outfall at the northern end of Druridge Bay has its hinged cover missing, making man-entry possible (below left). This should be replaced to maintain public health and safety. The dunes along Togston Links have eroded since the last walk-over inspections in 2008, with a distinct near-vertical face now cut into the underlying clay layer at their base. The dune face has experienced ongoing slumping, leaving small overhangs in the crest. Close to the car park by the piped outlet, further erosion has occurred and a clear 'dog-leg' exists where erosion has continued south of the short length of rock armour (below right). Attempts have been made to prevent this outflanking using rubble, but the 'step-back' erosion continues to the south, with the underlying peat layer exposed. The dunes become more stable towards Hadston Carrs, where a cobble berm is present at the toe and the rock outcrop affords some shoreline protection.

The outfall structure through which Ladyburn Lake discharges to sea remains in good condition, although the concrete fill between the outfall's south wall and the Hadston Scaurs Boat Club's concrete slipway is breaking up, with gaps evident and one slab cantilevered (below left). The four concrete blocks at the toe of the slipway are heavily abraded and the reinforcement mesh is starting to show (below right).

The rock revetment which protects the Hadston Scaurs Boat Club's slipway is in fair condition, but the outflanking to the south remains ongoing. There is evidence of an apparently recent large slump immediately in the outflanked section (below left), and smaller slumps further south adjacent to the road (below right).

The low soft cliffs and dunes in the northern part of Druridge Bay appear to have been more actively eroding than was observed in 2008. This even has occurred in well vegetated and apparently previously stable areas, in places revealing bricks exposed in the crest (below left). It is only with southerly progression towards the Visitor Centre that the dunes become more stable, where they are backed by a substantial cobble berm at their toe (below right).

In central and southern Druridge Bay, there is clear evidence that the dunes have relatively recently experience some storm-related damage, especially at gaps between frontages protected by anti-tank blocks, but there are lots of areas where the dunes either have remained stable or have recovered back to a stable state. High beach levels have, in places, almost fully buried the anti-tank blocks (below left). This healthy beach state is likely to have helped the dunes recover and they now appear to be behaving in typically observed manners, with quite frequent areas of slumping along the dune face (below left) and most toe 'cliffing' erosion focused around the mouths of the outfalls of the backing lakes and ponds (below right).

One structure is breaking up in the dune crest just south of the Visitor Centre (below left), and one partially buried narrow piped outlet at the southern end (just north of The Scars at Creswell) has a missing section (below right).

3.19 Creswell

In the southern end of Druridge Bay, at Creswell, the foreshore builds seawards in the form of a tombolo in the lee of the rocky foreshore outcrop of The Scars (below left). The rock revetment which protects the backing shoreline is very loosely constructed and to the north of the access steps was totally buried by high beach levels. Sand also covered a large part of the access steps themselves. To the south of the steps, there appeared to have been some loss of material from the cliffs behind the sparse revetment but this was not compromising the backing houses (below right).

The revetment blends into a low concrete wall built at the back of the rocky foreshore, with rock armour revetment placed behind the wall to protect the vegetated cliff (below left). The visible section of the wall appeared in fair condition, save for minor abrasion at areas of previous concrete repairs, although beach levels were high at the time of the inspections so parts of the structure were buried by sand. Of more concern, however, was the apparent tipping of construction waste (rubble) down the seaward face of the revetment in an area where building work was being undertaken by Langan Developments behind the property known as The Skears, creating an unsightly appearance (below right).

The cliffs backing Stark Letch Rocks have experienced extensive lengths of rockfall (below left), with some remaining rock being heavily fractured. The overlaying softer material has subsequently experienced slumping (below left). This is not threatening any assets, although the boundary fence of the backing field is suspended in mid-air in one place. Between Stark Letch Rocks and Brig Head, there were high levels of cobble and seaward accumulation on the foreshore, substantially covering the poor condition outfall and leading to ponding of its discharge, rather than the creation of a channel across the foreshore. The large sand berm on the upper foreshore, about 10m from the cliff toe, and the cobble berm, directly at the toe, meant that the backing cliffs were mostly stable (below right).

Further south, towards Snab Point, the cliffs become more active once again, where the cobble berm becomes sparser and the gabions are becoming damaged and outflanked (below left). Where the gabions have split, the cobbles have spilled out, resulting in slumping in the backing cliffs, including one area where the cliff top has now cut back to within a very short distance (a few centimetres) of the road edge (below right).

3.20 Snab Point

Approaching the Snab Point headland, two large rock falls have occurred to the north of the car park (below left) and erosion has occurred in the mound of land running along the southern edge of the small ‘inlet’ leading to the tidal pond created in the area of the disused quarry (below right).

Erosion has also occurred steps along the cliff on the northern edge of this inlet, adjacent to the foreshore access from the car park (below left), resulting in their closure to the public (below right).

The private defences comprising timber breastwork retaining walls, built shortly before the 2008 inspections, have been further improved with two new rows of timber breastwork in the area where slumping was continuing in the upper cliff (below left). There remains some upper cliff slippage immediately adjacent to this area, however, which over time could cause problems of undermining or outflanking (below right).

Generally, further south around Snab Point, there have been occasional local slumps in the upper softer material with local rock falls in the underlying rock ledge (below).

In one location, an obsolete blockwork structure built into the softer upper cliff material and sitting on the rock ledge is actively breaking up (below left), with debris falling on to the rock ledge, and slightly further south a set of timber access steps has damage to both its handrailing and step boards and is actively being outflanked by erosion (below right).

3.21 Lynemouth Bay

The northern section of Lynemouth Bay comprises a low rock cliff overlain with softer material. There is evidence of local rock falls in the basal layer and slumping in the softer material, despite the presence of much vegetation on the cliff face (below left). Further south, the protection afforded by the wide spoil beach means that the low cliffs are much more stable, adopting a shallow profile with considerable vegetation cover (below right).

The shoreline fronting Lynn Hill is less well protected by a spoil beach. Where a narrow width of is present, it is actively eroding, resulting in cliffing on the seaward face (below left). Where there is no spoil beach present, the backing spoil cliffs are eroding, releasing debris to the foreshore. Where these cliffs contain softer soil there is evidence of soil cracking, slumping and a steep profile. Along one short length, the cliff face is entirely composed of colliery spoil in a near-vertical profile (below right).

Further south, towards the outflow channel of the River Lyne, the spoil beach is reinstated and again the backing slopes become stable (below left). The channel of the River Lyne is quite wide, deep and fast-flowing, with a stone weir built across the foreshore (below right).

South of the River Lyne, there is a short length of undefended colliery spoil 'cliff', formed by historic waste tipping over the coastal slope, which is very actively eroding, releasing waste of various descriptions onto the foreshore (below left). The land behind this actively eroding frontage is effectively a spoil yard with no built assets (below right). Consideration should be given, however, to the environmental impact of the continued release of waste from this eroding frontage.

The rock armour revetment constructed in front of the Power Station in 1995 (below left), and then extended around the coal stocking yard in 2005 (below right), remains in good condition.

There is, however, some erosion at the southern end where the revetment 'tapers out' and the cliff line is undefended (below left). This is not presently outflanking the defence, but the situation should be monitored. Between this section and Beacon Point, the shoreline again comprises colliery spoil, with erosion of the spoil cliff in the north ongoing at modest rates (below right) before the central and southern sections become more stable, with wide backing dues and a fronting cobble berm.

3.22 Beacon Point, Newbiggin Moor and Church Point

The cliffs leading around the headland to Beacon Point are comprised of a hard rock base and a thin overlying layer of softer material. Here there are small-scale rock falls with occasional local slumps in the soft material (below left). Further around Beacon Point, the slumps in the upper cliff have cut the cliff top back to the footpath in a number of areas (below right), but there is sufficient space to realign the path landwards when necessary. The cliffs here are fronted by an extensive rock ledge and therefore the recession rates are low and the events are very localised.

Along the main section of cliffs within the shallow bay fronting the golf course at Newbiggin Moor, however, the cliffs are unprotected by rock platform and have no rock base and as a consequence are more actively slumping along their length (below left). Cracking in the cliff top and steep profiles (below right) indicate that slumping will remain ongoing and parts of the golf course will need to be reconfigured over time. In one location, the cliffs dip to a lower level and here rubble has been tipped to prevent erosion and sea flooding.

The cliffs fronting Newbiggin Caravan Park comprise three distinct sections. The northern section is unprotected by coastal defences or rock platforms and is actively eroding through a series of regular local slumps (below left). This has prompted the Caravan Park to erect warning signs along the cliff top footpath and realign short lengths of its boundary fencing (below right).

The central section is protected by concrete anti-tank blocks and these have assisted to an extent in generally stabilising the cliffs (below left); although some slumps have continued locally in places the cliffs are considerably less active than the undefended section to the north. The southern section is protected by a rock ledge (below right) but, despite this, occasional local slumps remain evident. In both sections, efforts to arrest the slumping have been made by local tipping of rubble down the cliff face.

Along the southern section of the Newbiggin Caravan Park, two pill boxes (below) are located on the rock ledge, with erosion of the surrounding soft cliff material now leaving them perched precariously.

Extending between Newbiggin Point and Church Point is a continuation of the rock ledge, with overlaying softer material, interspersed with a series of ad-hoc defences to ‘patch’ local areas.

At Beacon End a short length of concrete seawall is present, which appears to have a fair condition seaward face (below left), despite a vertical crack which has not worsened since the 2008 inspection, but which is continuing to suffer badly from toe abrasion, undermining and most notably outflanking, particularly at the return-section 'tie-ins' at either end of the structure. These tie-ins are being undermined and outflanked (below right). The soft cliff material behind each return section is actively being eroded and slumping, thereby further contributing to the problem. The overall situation at this seawall seems to have worsened since the 2008 inspections.

The second length of seawall is slightly further south around Newbiggin Point and remains in very poor condition. The tie-in sections remain actively breaking up, with concrete debris remaining on the rock ledge. Although the damage at the northern tie-in looks recent, this situation was also recorded in the 2008 inspections (below left). Further deterioration undoubtedly is occurring, however, at the southern tie-in where outflanking due to erosion of the soft cliff continues (below right).

Between here and the larger Church Point seawall, the cliffs are composed of a continuation of the low, irregular rock ledge, with overlaying soft material which remains actively slumping locally, causing the soil netting used in attempt to stabilise the land to become unravelled (below left). Where the rock ledge has become locally eroded, localised concrete and masonry walls have been built to infill crevices in ten areas. All of these structures are experiencing undermining and toe abrasion, although this is particularly problematic in the five most northerly wall sections (below right).

The vertical, northern, end of the Church Point seawall is in an overall fair condition, although there is a reasonable amount of abrasion at the toe and crest and there signs of local toe undermining (below left). The hand railing is badly rusted and needs replacement. The recurved section of the seawall, extending towards the original breakwater, is generally also in fair condition, although missing sealant at the base of the joints should be replaced and there is some undermining of the poured concrete apron nearer its western end (below right).

3.23 Newbiggin Bay

The start of Newbiggin Bay is marked by the original rock breakwater (below left), built along the edge of Hully Rocks extending from near the shore at Church Point (although the structure is not actually shore-connected). This is in good condition, although there are a few displaced rocks now sitting on the foreshore. The newer offshore breakwater (below right), constructed in the centre of the bay as part of the 2007 scheme, is composed of inter-locking concrete units and appears in 'as built' condition.

The sea walls throughout Newbiggin Bay are protected by high beach levels following the beach replenishment operations in 2007, although some wind-blown sand was observed at the rear of the promenade (below left) and a tractor was observed on the beach (below right), apparently recycling some sand from the northern part of the bay. In the replenished beach a 'salient' feature (build up of sand towards the breakwater) is forming in the centre of the bay, in the quiescent zone in the immediate lee of the offshore breakwater.

At the southern end of the bay, the seawall is further protected by a short length of rock revetment (below left), which then grades into undefended coastal slope which generally remains stable (below right).

3.24 Spital Point to River Wansbeck Estuary

At Spital Point, the cliffs are mostly stable, but there is evidence of occasional rockfalls (below left) which have left the overlaying softer material overhanging in places (below right).

South of the headland, Northumbrian Water Limited's storm outfall is very well protected by rock armour and the concrete headwalls are sound (below left). To the immediate north, there is an older concrete outfall structure, which is being slightly outflanked where it sits into the soft cliff material overlaying the hard rock base at Spital Point (below right).

South of the outfall, there is a short section of cliff fronting Links Quarry which has significant quantities of rubble and quarry waste tipped down its seaward face and actually comprising its core (below left). This continues to experience slumping in the softer material, releasing waste and debris onto the foreshore (below right).

Hawks Cliff (below left) generally experiences gradual, local erosion caused by slumping in the upper soft material and occasional rock falls in the base. However, over the severe winter of 2009/2010 the whole section has been active. Tragically, there was a fatality in January 2010 when a section of cliff collapsed during severe weather (freezing temperatures, heavy rainfall and snow loading) and harsh marine conditions (high tide storm) and a sea angler standing on the cliff top fell to the foreshore. This section not only appears to have experienced a rock fall, but a slump in some of the overburdening till was also triggered by this event (below right).

It is clear to see that there has now been significant fracturing in the rock structure along the whole length of cliffs (below left). Much of this fractured section has recently been active, with numerous rock falls (below right).

These have left many notable rock overhangs (below) which, together with the fracturing to the remaining rock structure, leave the cliff line in a precarious situation. The owners of Sandy Bay Caravan Park have placed warning signs and fenced of a section of the cliff-top footpath, diverting it slightly inland.

The cliffs directly fronting Sandy Bay Caravan park have experienced occasional slumps at the northern end and then more frequent slumping further south where there is no protective shore platform (below left). Despite the presence of three nearshore rock berms on the foreshore (below right), erosion of the cliffs behind continues and rubble has been tipped down the cliff in attempt to arrest this.

3.25 River Wansbeck Estuary

This section comprises a sheltered estuarine frontage. On the north bank there is an accreting sand spit (below left) which is pushing the estuary channel more towards the south bank. This is backed by stable dunes. On the south bank there is a steeper sandy foreshore topped with occasional cobbles (below right). The main channel of the estuary encroaches close to this south shore.

One local resident spoken to whilst dog-walking on the beach mentioned that at low water it is now possible to wade across the estuary mouth between Cambois and Sandy Bay due to the presence of a sand island in the channel and relatively shallow channel depths where its discharge fans out across the foreshore (below).

Associated with the Wansbeck Boat Club are various lengths of masonry walls and slipways. In the indented 'bay' these have often been patched-up, but around the protruding earthen and rubble 'promontory' the masonry wall has failed and the backing land and rubble is being washed-out (below left). Eastwards of this feature, the walls are somewhat patched-up (below right). Further patch repairs should be made to the failing promontory to avoid further rubble and soil being washed into the estuary.

The undefended section of cliff within the estuary mouth appears very stable, with no visible signs of erosion or slippage and with the face being densely vegetated.

3.26 Cambois

With progression between the sheltered estuarine frontage with its stable cliffs and the more active open coastline of Cambois Bay there lays a transitional section of cliff fronting Cambois House. Here there has been some cliffing noted at the toe of the cliff (below left) and, further south-eastwards, there is clear evidence of toe erosion and cliff face slips (below right). These appear to have increased in extent since the 2008 inspection, causing some cliff top recession immediately south of the southern boundary of the garden of Cambois House.

Further south along the open coast, the cliffline then has become highly active with clear evidence of recent, and ongoing, failures (below) in the industrial spoil material that was tipped over the edge of the dunes, thereby burying them and advancing the shoreline position. Given the extent and ongoing nature of the changes along this section of shoreline, it may be worth re-visiting the previous Cambois Pre-feasibility Study to update consideration of management options. At the very least, warning the public against the dangers of parking their vehicles on the cliff top to view the sea should be undertaken – one local resident mentioned that 2-3 cars per day are parked up at this point, despite it being private land with no formal access tracks.

The pill box which was previously eroded out from the cliff face has started to break up on the foreshore, and although it does still act as a local hard point control, cliff slumping is continuing in its lee (below left). At the intersection of the cliffs with the access ramp from the car park, the tipped rock armourstone and large rubble is partially stabilising the outflanking problem of the ramp, although again slumps are continuing in the cliffs behind (below right).

The rock revetment that was constructed by private industry to protect the former foundry remains in a good condition, with a stable and well vegetated slope behind (below left). At the southern end, near the long sea outfall, the problem of 'downdrift' erosion remains ongoing along a length of approximately 50m (below right) and future surveys should continue to check for outflanking of the revetment.

Further south, the cliffs exhibit more typical behaviour of occasional local slumps (below left), especially between the two outfalls. The southerly outfall is broken and obsolete. Around this point, soil netting has been exposed in one cliff slump (below right).

Southwards of the southern outfall, the frontage is characterised by dunes. Along their northern section, the toe is eroding in clumps along a considerable length (below left), but further south the behaviour typically reverts to occasional slumps within otherwise generally stable areas (below right).

Towards the south of the dunes, a cobble berm is formed on the beach, affording protection to the backing dunes which have become very stable and well vegetated here (below left). There remain occasional lengths where slumping has occurred, but this dune erosion does not presently cause a concern for management, other than threatening the loss of a public warning sign (below right).

3.27 North Blyth

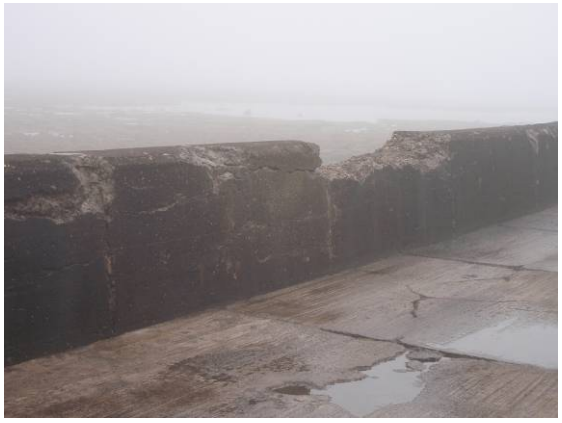
The whole North Blyth frontage is protected by man-made defences. At the northern end, these comprise a rock revetment capped with rock-filled gabions, which is a substantial structure that remains in fair condition (below left). At the northern end of this revetment there has been cut-back erosion, however, and efforts have been made to reduce this by tipping rock (below right). This has simply deflected the problem area further north.

The revetment changes further south to a composite structure with large rock armourstones at the base, separated from the smaller upper armourstones by steel breastwork which now seems largely in a poor condition, with extensive corrosion and numerous failed members (below left). There are a few slumps in the cliffs behind the revetment and towards the southern end, some rubble has been tipped down the cliff to fill such sections. Some of this rubble has fallen into the revetment and some onto the upper foreshore (below right).

Fronting Alcan's facilities is a composite structure comprising timber breastwork (below left) with a backing tipped rubble slope (below right), sitting on a concrete apron with rock armour at the toe.

The timber breastwork is considerably damaged in places, with broken vertical timber boards (below left), and rotten horizontal fixing beams (below right). There is a risk that without further maintenance the breastwork may fail, spilling rubble onto the foreshore. There is an obsolete outfall structure on the foreshore.

A seawall then extends south to the Blyth East Pier (below left). The seaward face has abrasion at the toe apron, vertical cracks, gaps in vertical joints between some adjacent section units, and occasional horizontal cracks. The crest wall has one damaged section (below right), but immediately adjacent are four section units with a continuous horizontal crack connecting to the failed section. There are also numerous defects in the deck and evidence that overtopping occurred at the preceding high water. This section of wall is in urgent need of repair. Blyth East Pier was not inspected due to access restrictions.



3.28 Blyth South Beach

The northern section of Blyth South Beach comprises a wide sandy beach backed by dunes. Two major port structures, the West Pier (below left) and the South Pier (below right), are present extending across the beach and nearshore zone. Both structures form important controls on coastal processes in the vicinity and, together with the East Pier, define the mouth of the River Blyth estuary. The West Pier is comprised of concrete and has several cracks and concrete abrasion. The South Pier is a more permeable timber structure, with some rock armouring. Neither structure is classified as a coastal defence within NFCDD.

At the rear of the dunes is a boundary wall of the Port of Blyth facilities (docks, berths and haulage road to the port). The beach levels in the spending beach, between the West Pier and the South Pier, remain healthy and the dunes are vegetated and stable. Initially the backing boundary wall is comprised of a brick wall on a concrete toe, with concrete coping and regular brick strongbacks (below left). This section of the boundary wall has some very minor cracking and occasional loss of mortar at joints in the concrete coping but overall is in fair condition. The width of dunes decreases with progression south and the boundary wall changes in form to a concrete plank wall supported by concrete posts. The wall has occasional missing concrete planks but remains well protected by dunes in its northern section. Further south, however, towards the outfalls that cross the foreshore, the dune width narrows considerably and the seaward face of the dunes is cliffing through erosion (below right). This section of dunes needs careful consideration by the Port of Blyth so as to prevent breaching through to haulage road to the port.

Along the southern-most section of the port boundary wall, the dunes are protected along the seaward face and toe by cobble-filled gabions. These appear to have deteriorated further since the 2008 inspections and now at both ends of this length, the gabions have broken and spilled cobbles onto the foreshore (below). Replacement of broken gabions should be undertaken, potentially in conjunction with consideration of management options for the undefended dunes further north, as described above.

South of the gabions is a short section of sea wall that protects backing properties. Beach levels at this frontage can vary and during the inspections rocks were noted at the toe of the wall (below left), as was the case in 2006. During the 2008 inspections these had been covered by beach sand at the toe of the wall. The wall itself is on good condition, but with some gaps at construction joints which should be re-sealed. At the southern end, concrete slurry has now been further protected by tipped concrete rubble, presumably to prevent undermining. (below right)

South of the boat ramp, the short section of sea wall is mostly buried by vegetated sand dunes. These dunes appear stable, whereas in 2008 they were notably eroding. The wall itself remains generally sound in the visible areas, although the cracks should be filled through routine maintenance. A new outfall through the wall appears to have been constructed since the previous inspections (below left). The cosmetic damage to the ornamental wall, noted in 2008, has been addressed through new coping on the access ramps (below right).

South of the dunes, runs a fairly aged sea wall, which has numerous cracks and notable abrasion and staining at its northern end (below left) which could usefully be addressed through maintenance. Some cracks have previously been filled, but these remain in need of further attention. At the northern end, the access steps remain horizontally cracked and a little undermined at their toe, despite replacement of the previously damage coping since the 2008 inspections (below right). In this northern section, the upper part of the sandy foreshore is covered by a thin veneer of cobbles which were not noted in 2008.

The main promenade and backing amenity area towards the north of Blyth South Beach has undergone notable regeneration since the previous inspections, with new promenade decking and the construction of the Dave Stephens Centre (below left), a micro wind turbine, a large children's play area and several beach huts (below right).

The sea wall fronting the promenade was largely buried by high beach levels at the time of the inspections, but some minor cracks and gaps at construction joints were noted in the visible sections of wall, as well as a few patchy areas of abrasion, leading to exposed and corroded reinforcement bars (below).

A temporary ramp of sand had been constructed to enable construction plant to access the foreshore via the concrete access ramp towards the southern end of the promenade (below left). Tracks were observed extending as far north as the spending beach and southwards around the toe of the timber groynes, suggesting some sand recycling had occurred along the frontage from the spending beach to the vulnerable section of dunes. At the southern end of the sea wall, the sheet piles protecting the 'tie-back' section remain corroded (below right), but do not appear to have worsened since the 2008 inspections.

The three timber groynes remain in sub-optimal condition, with missing timber planks (below left) or sizeable gaps between planks, although they are all still functional. Beach users have started walking around the landward end of the groynes, causing dune erosion at each location (below right). In contrast to the 2008 inspections, when the dunes backing the foreshore protected by goynes were stable, some erosion of these dunes was now noted. During the 2008 inspections, it was noted that the navigation marker beacon of the middle groyne was broken and the southern groyne was missing; both of these have now been replaced with new beacons.

Meggie's Burn had very little water discharge due to the relatively dry summer experienced to date, and remained blocked with sand at the discharge pipe to a notable level. In 2008 the channel that cuts across the foreshore tended in a northerly direction upon leaving the concrete outlet pipe. At that time, this resulted in erosion of dunes to the north. During the 2010 inspections, a far more southerly-orientated channel was observed (below left). As a consequence, the upper foreshore to the north of the burn accumulated sediment and protected the dunes, making them more stable, but those to the south were actively cliffing and eroding. This dune erosion extended a short distance south of the outfall, where some concrete debris was being eroded from the dune face behind an area where concrete anti-tank blocks were being used for protection at the toe (below right).

Beach levels at the toe of the dunes and in the areas in central South Beach, where hollows in the dune crest and face are often observed, were high (below left). This may be due to natural recovery following storm damage over the winter of 2009/2010 or may have been assisted by replenishment with sand recycled from the spending beach. Some sections of this central frontage did remain eroding, however, with slumps down the seaward face of the dunes (below right). Along this central section, concrete anti-tank blocks have been used to help provide a degree of protection.

The sand-filled geotextile bags used to stabilise the dune toe on the two most vulnerable sections of the central frontage were not observable due to high foreshore levels at the toe. Christmas trees placed in barren areas to encourage sand trapping and dune build up have been reasonably effective, although there has been no dune vegetation establishment (below left). The southern section of South Beach remains highly stable and there has been notable pioneer vegetation growth on the lower dunes (below right). The low masonry wall towards the southern end of South Beach remains in good condition.

The timber groyne at the mouth of Seaton Burn has signs of timber damage (below left), missing boards and now at the upper section some arson damage. The land area behind the groyne requires some attention where the denudation of fill material is undermining the concrete deck of the short harbour arm (below right).

3.29 Seaton Sluice

The western bank of Seaton Burn has a short harbour arm (below left) which is in fair condition, although the concrete deck is in danger of being undermined from behind the timber groyne at the southern end of South Beach, as discussed above. The adjacent length of masonry wall often has sand accumulation on the crest, making access difficult and potentially dangerous. The wall itself has some gaps between blocks in the northern section which should be filled (below right).

Towards the A193 road bridge, the boat ramp has some un-repaired damage (below left) and there is voiding under the access steps to the mudflats near the road bridge (below right).

The eastern bank of Seaton Burn extends eastwards from the A193 road bridge. The section from the bridge to the channel that separates Rocky Island from the mainland is generally fine in the west (below left) but becomes highly abraded in the east, towards the channel at Rocky Island, where there is a need for urgent maintenance attention near the crest of the wall since this area is regularly used by local vessels for berthing (below right).

The eastern bank section from the channel, extending along the western side of Rocky Island, is generally in good condition (below left), although with some local areas of settlement, missing mortar and gaps between adjacent blocks which should be repaired through routine maintenance (below right).

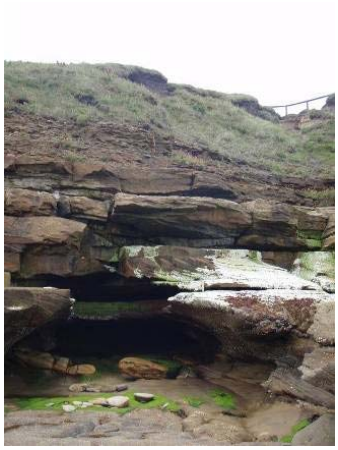
3.30 Rocky Island

At the western end of Rocky Island is a large concrete pier which remains generally in fair condition, although there is some foreshore lowering at the toe of the apron at the head of the pier (below left). The inner face of the pier has a revetment which also remains in fair condition (below right).

Extending eastwards from the pier, along the northern side of Rocky Island, is a length of masonry sea wall fronted by a rocky platform. There are some areas of block abrasion (below left), but this has not worsened since the 2008 inspections. There is one area near previous repairs where there are two cracks at the crest which should be filled (below right).

Where this wall joins the pier, there is some missing coping which should be replaced to avoid blockwork becoming worked loose (below left). The main issue with this section, however, is landward of the wall, where the poured concrete slurry at the rear of the ramped pavement is breaking up and soil erosion of the land is continuing (below right). This area is quite widely used for public access to the pier head.

The remainder of the northern face of Rocky Island is undefended hard rock cliff mantled with softer material. The hard rock structure is, to a degree, fractured and there are occasional rock overhangs, local rock falls and, in two places, caves have formed at the base of the cliffs (below left). One cave is close to an area where a previous slump in the softer material has caused concern about the sustainability of the footpath and watch house, but this area does not seem to be further active than at the time of that slump (below right).



3.31 Collywell Bay

Extending south from the channel separating Rocky Island from the mainland, the undefended cliffs appear less fractured than those along Rocky Island and, other than occasional local rock falls, appear relatively stable.

The bay itself comprises several sections of different sea wall. In the north, the near vertical concrete wall (below left) is generally in good condition, with some minor cracks in the upper section, but the concrete toe is badly abraded and the timber wailing is virtually obsolete (below right).

The adjacent wall has a sloping brickwork revetment covering part of the coastal slope. The wall is in generally good condition, despite some abrasion near its base just above the stepped toe (below left), but the brickwork revetment has an un-repaired crack (below right).

The wall further south continues to have abrasion and exposed rotting timber at the toe of the stepped apron (below left) but remains in good overall structural condition despite this, although the wall should continue to be monitored for any signs of undermining that could lead to failure. To the immediate south of this wall, there is a brick wall adjoining an access ramp. This wall has an area with several missing bricks (below right) and the ramp is abraded.

The high vertical concrete wall is generally in fair condition, but requires maintenance work to fill three notable vertical cracks (below left). The apron at the toe is very highly abraded and in places cracked horizontally (below right).

The wall at the southern end of Collywell Bay has high beach levels at the southern end, but where these drop with progression north, the stepped toe becomes more abraded. The wall has minor abrasion and some minor gaps at construction joints which could usefully be re-sealed but otherwise is in fair condition. Whilst there is no major activity of the cliffs behind the wall, some local slumps have occurred (below left) and debris remains on the wall crest (below right).

Adjacent to the sea wall, gabions protect the coastal slope along a beach access ramp. These gabions remain in a poor condition, with some split, bulging and rotated baskets (below left). The access ramp itself is undermined where it joins the rocky shore platform (below right).

There is also undermining and outflanking where the ramp joins the undefended cliffs at its other end (below).

The coastal slope adjacent to the ramp has experienced occasional small-scale slumps but this does not present any concerns at present. The harder rock cliffs extending from Crag Point to the southern boundary of Northumberland County Council part-way along Hartley Cove have some fracturing to the rock structure. As a result of this fracturing, several rock falls have occurred (below left) leaving numerous overhangs. In places caves have formed at the base of the cliffs (below right).

4. Comparison with Previous Assessment

The previous formal assessment across the whole study frontage was undertaken in summer 2008. Since that time, some frontages have benefited from capital and maintenance works, such as the Tweed Breakwater and North Sunderland Harbour Outer Breakwater. Of the remaining frontages, the most major changes since 2008 are:

- Rockfalls, slumping and fracturing of undefended sea cliffs – especially during the harsh winter of 2009/10.
- Erosion of sand dunes during the winter storms, in many places followed by subsequent natural stabilisation or recovery, but elsewhere (e.g. Spittal Point) indicating an ongoing erosional trend.
- Ongoing erosion of colliery spoil beaches and clifflines at Lynemouth.
- Further deterioration of some sections of sea wall or pier structures, especially Green Haven's Breakwater, Tweed Breakwater, North Sunderland Harbour Main Pier, Beadnell Sea Wall, Warkworth Harbour North Pier, Broomhill Quay and Blyth East Pier.
- Deterioration of gabions protecting dunes or slopes at River Tweed south bank, Snab Point, and Blyth South Beach.
- Deterioration of soil netting stabilising slopes and cliffs at Holy Island and Newbiggin Point.
- Undermining of coastal structures, widespread through the frontage, and outflanking of coastal structures, especially in areas where there is a transition between defended and natural sections of coastline.

Many other defects reported in 2008 remain unaddressed, but have not notably deteriorated further since the previous inspections.

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 following points should however be noted:

1. Some coastal defence assets extend across privately-owned frontages where public access is denied by boundary fencing and warning signs (e.g. Tweed Dock, Amble South Jetty, Blyth East Pier, etc.). In these areas, the assets were not fully walked-over and instead inspections were only undertaken from the nearest permissible vantage point.

2. Some breakwaters and piers fully, or significantly, dry at low tide (e.g. Fisherman's Haven, Beadnell Harbour, etc.) and can be fully included in the walk-over inspections by suitable timing of the survey. Other breakwaters and piers extend further into deeper water and do not fully dry at low tide (e.g. North Sunderland Harbour, Warkworth North Pier, Blyth East Pier, etc.). In these areas information from other vessel-based surveys, dive-based surveys or intrusive investigations has been incorporated where available. It is recommended that the relevant harbour authority undertakes suitable inspections using appropriate techniques of the submerged sections of these breakwaters and piers at suitable intervals.

3. Walk-over inspections of quayside assets has been undertaken to identify evidence of cracking or settlement in the quay deck and, as far as practicable, any defects in the quay wall. Inspecting the quay wall face is difficult from the quayside and in these areas it is recommended that the relevant harbour authority undertakes additional vessel-based inspections at an appropriate stage of the tide at suitable intervals.

6. Conclusions and Recommended Actions

This section to be completed from NFCDD once all data entries have been completed 'offline'.

Specific recommendations for individual assets are given in the table below:

Defence	Location	Description	Priority	Recommended Action Date	Recommended Action	Details
121AA901A0601C01	Marshall Meadows Point	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A0601C02	Marshall Meadows Point	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A0601C03	Marshall Meadows Point	Cliff	no repairs	31/12/2010	notify third party and seek action	Future rock falls anticipated
121AA901A0601C04	St Johns Haven	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A0601C05	Needles Eye	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A0601C06	East Hope Bay	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A0701C01	Brotherston's Bay	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A0701C02	Sharper's Head	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A0701C03	Green's Haven	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A0701C04	Green's Haven	Breakwater	urgent	31/12/2012	improve condition through maintenance	Requires repair to crest and seaward end.
121AA901A0701C05	Green's Haven	Steps	no repairs	31/12/2012	continue active monitoring	
121AA901A0701C06	Green's Haven	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A0701C07	Fisherman's Haven	Apron	no repairs	31/12/2012	continue active monitoring	
121AA901A0701C08	Fisherman's Haven	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A0701C09	Fisherman's Haven	Sea Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A0701C10	Fisherman's Haven	Wall/Apon/Bank	no repairs	31/12/2012	continue active monitoring	
121AA901A0701C11	Fisherman's Haven	Steps	no repairs	31/12/2012	continue active monitoring	
121AA901A0701C12	Colly Skerr	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A0701C13	Meadow Haven	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A0701C14	Meadow Haven	Breakwater	no repairs	31/12/2012	continue active monitoring	
121AA901A0701C15	Berwick	Breakwater	urgent	31/12/2010	include in capital programme	Repair face urgently.
121AA901A0801C08	Berwick City Walls	Bund	no repairs	31/12/2012	continue active monitoring	
121AA901A0801C07	Berwick City Walls	Sea Wall	routine	31/12/2010	improve condition through maintenance	Local repair to slipway.
121AA901A0801C06	Berwick City Walls	Sea Wall	no repairs	31/12/2010	improve condition through maintenance	Minor - fill cracks.
121AA901A0801C05	Berwick City Walls	Sea Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A0801C04	Berwick City Walls	Revetment	no repairs	31/12/2012	continue active monitoring	
121AA901A0801C03	Berwick City Walls	Other	no repairs	31/12/2010	improve condition through maintenance	Minor - fill cracks.
121AA901A0901C04	Davies Batt	Bank and Revetment	urgent	31/12/2010	improve condition through maintenance	Repair broken gabions (short term) while ongoing Tweed Estuary Study and redevelopment proposals provide input to medium and longer-term solutions.
121AA901A0901C05	South Bank	Sea Wall	routine	31/12/2010	improve condition through maintenance	Localised repairs to walls to fill gaps, especially near the flap valve.
121AA901A0901C06	Spittal Quay	Pier	routine	31/12/2010	improve condition through maintenance	Infill gaps in joints.

Defence	Location	Description	Priority	Recommended Action Date	Recommended Action	Details
121AA901A0901C07	South Bank	Wall	routine	31/12/2010	improve condition through maintenance	Local rebuilding toe.
121AA901A0901C08	Spittal	Dunes	routine	31/12/2010	notify third party and seek action	Consider dune erosion in development proposals.
121AA901A0901C09	Spittal Point	Sea Wall	no repairs	31/12/2012	continue active monitoring	Ongoing monitoring and Tweed Estuary Study will inform understanding
121AA901A0901C10	Spittal Point	Revetment	no repairs	31/12/2012	continue active monitoring	
121AA901A1001C01	Spittal Point	Wall and rock armour	routine	31/12/2010	improve condition through maintenance	Repair broken gabions.
121AA901A1001C02	Spittal Promenade	Sea Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A1001C03	Spittal Promenade	Sea Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A1001C04	Spittal Promenade	Revetment	no repairs	31/12/2012	continue active monitoring	
121AA901A1001C05	Spittal Promenade	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A1101C01	East of Scremeston	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A1101C02	Scremeston	Other	no repairs	31/12/2012	continue active monitoring	
121AA901A1101C03	Scremeston	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A1101C04	Scremeston	Other	no repairs	31/12/2012	continue active monitoring	
121AA901A1101C05	Scremeston	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A1201C01	The Skerrs	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A1201C02	Cheswick Black Rocks	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A1201C03	Cheswick	Cliff/Dune	no repairs	31/12/2012	continue active monitoring	
121AA901A1301C01	Cheswick Sands	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A1401C31	Goswick Sands	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A1401C01	Goswick Sands	Sluice	routine	31/12/2010	improve condition through maintenance	Minor repair and pitching.
121AA901A1401C02	Goswick Sands	Slope	no repairs	13/01/2012	continue active monitoring	
121AA901A4901C01	Holy Island	Dunes	no repairs	31/12/2010	improve condition through maintenance	Asphalt repairs to edge of causeway.
121AA901A4901C02	Holy Island	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A4901C03	Holy Island	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A4901C04	Holy Island	Foreshore	no repairs	31/12/2012	continue active monitoring	Reposition bench if local erosion of dune above cobble berm continues.
121AA901A4901C05	Holy Island	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A4901C06	Holy Island	Wall	routine	31/12/2010	improve condition through maintenance	Repairs to access ramp (cosmetic), infill missing blocks and mortar, infill undermined and outflanked areas of wall.
121AA901A4901C07	Holy Island	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A4901C08	Holy Island	Wall	routine	31/12/2010	improve condition through maintenance	Infill cracks and gaps.
121AA901A4901C09	Holy Island Pier	Breakwater	routine	31/12/2010	improve condition through maintenance	Minor infill and repointing.

Defence	Location	Description	Priority	Recommended Action Date	Recommended Action	Details
121AA901A4901C10	The Harbour	Foreshore	routine	31/12/2010	improve condition through maintenance	Remove obsolete outfall.
121AA901A4901C11	Holy Island	Bank	no repairs	31/12/2012	continue active monitoring	
121AA901A4901C12	Holy Island	Wall	routine	31/12/2010	improve condition through maintenance	Infill gap under masonry wall
121AA901A4901C13	Holy Island	Cliff	routine	31/12/2010	improve condition through maintenance	Replace netting where rock has fallen out and potentially extend netting to undefended areas if erosion starts to present a problem
121AA901A4901C14	Holy Island	Bund	no repairs	31/12/2012	continue active monitoring	
121AA901A5001C01	Holy Island	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A5001C02	Holy Island	Bund	no repairs	31/12/2012	continue active monitoring	
121AA901A5001C03	Holy Island	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A5001C04	Holy Island		no repairs	31/12/2012	continue active monitoring	
121AA901A5001C05	Holy Island	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A5001C06	Holy Island	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A5001C07	Holy Island	Cliff	no repairs	31/12/2010	notify third party and seek action	Metallic object on foreshore.
121AA901A5001C08	Holy Island	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A5001C09	Holy Island	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A5001C10	Holy Island	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A5001C11	Holy Island	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A1401C23	Fenhan Flats	Slope/Bank	no repairs	31/12/2012	continue active monitoring	
121AA901A1401C24	White Hall	Slope/Bank	no repairs	31/12/2012	continue active monitoring	
121AA901A1401C98	Cockly Knowes	Embankment	routine	31/12/2012	improve condition through maintenance	Infill gaps between stones.
121AA901A1401C25	Cockly Knowes	Slope/Bank	no repairs	31/12/2012	continue active monitoring	
121AA901A1401C99	Guile Point	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A1401C06	Ross Back Sands	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A1401C26	Budle Bay	Slope	no repairs	31/12/2012	continue active monitoring	
121AA901A1401C27	Budle Bay	Revetment	routine	31/12/2012	continue active monitoring	
121AA901A1401C28	Budle Bay	Slope	no repairs	31/12/2012	continue active monitoring	
121AA901A1401C29	Budle Bay	Revetment	routine	31/12/2012	improve condition through maintenance	Repair revetment.
121AA901A1401C30	Budle Bay	Slope	no repairs	31/12/2012	continue active monitoring	
121AA901A1401C22	Budle Bay	Revetment	routine	31/12/2012	improve condition through maintenance	Re-bind revetment.
121AA901A1401C13	Budle Bay	Sea Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A1401C14	Budle Bay	Revetment	no repairs	31/12/2012	continue active monitoring	
121AA901A1401C15	Budle Bay	Sea Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A1401C16	Budle Bay	Revetment	no repairs	31/12/2012	continue active monitoring	
121AA901A1401C17	Budle Bay	Sheet Piling	no repairs	31/12/2012	continue active monitoring	

Defence	Location	Description	Priority	Recommended Action Date	Recommended Action	Details
121AA901A1401C18	Budle Bay	Sluice Gate	no repairs	31/12/2012	improve condition through maintenance	Regular maintenance.
121AA901A1401C19	Budle Bay	Sheet Piling	no repairs	31/12/2012	improve condition through maintenance	Repair damaged breastwork.
121AA901A1401C20	Budle Bay	Revetment	no repairs	31/12/2012	continue active monitoring	
121AA901A1401C21	Budle Bay	Slope	no repairs	31/12/2012	continue active monitoring	
121AA901A1501C08	Waren Mill	Slope	no repairs	31/12/2012	continue active monitoring	
121AA901A1501C02	Waren Mill	Wall	routine	31/12/2012	improve condition through maintenance	Re-instate blockwall
121AA901A1501C03	Waren Mill	Slope	no repairs	31/12/2012	continue active monitoring	
121AA901A1501C04	Chesterhill Slakes	Revetment	routine	31/12/2010	improve condition through maintenance	
121AA901A1501C05	Budle	Slope	routine	31/12/2012	continue active monitoring	Manage potential loss of tall trees from edge of river bank.
121AA901A1501C06	Newtown Hill	Slope	routine	31/12/2012	continue active monitoring	Investigate dune blow out/ drainage issues
121AA901A1501C07	Bamburgh Moor	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A1601C05	Redbarns Links	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A1601C02	Redbarns Links	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A1601C03	Greenhill Links	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A1601C04	St Aidan Dunes	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C54	North Sunderland	Cliff/Wall	urgent	31/12/2010	improve condition through maintenance	Repair coping.
121AA901A1701C02	Heela Hope	Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C03	Heela Hope	Wall	routine	31/12/2010	improve condition through maintenance	Repoint wall.
121AA901A1701C04	Heela Hope	Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C05	North Pier	Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C06	North Pier	Wall	no repairs	31/12/2012	continue active monitoring	Monitor crack near the top of the wall
121AA901A1701C07	North Breakwater	Wall/Revetment	urgent	31/12/2010	include in capital programme	Encasement of full structure.
121AA901A1701C08	North Breakwater	Wall	urgent	31/12/2010	include in capital programme	Encasement of full structure.
121AA901A1701C09	North Breakwater	Wall	urgent	31/12/2010	include in capital programme	Encasement of full structure.
121AA901A1701C10	North Sunderland	Breakwater	routine	31/12/2010	improve condition through maintenance	Repair coping.
121AA901A1701C11	North Sunderland	Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C12	North Sunderland	Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C13	North Sunderland	Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C14	North Sunderland	Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C15	North Sunderland	Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C16	North Sunderland	Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C17	North Sunderland	Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C18	North Sunderland	Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C19	North Sunderland	Revetment	no repairs	31/12/2012	continue active monitoring	

Defence	Location	Description	Priority	Recommended Action Date	Recommended Action	Details
121AA901A1701C21	North Sunderland	Breakwater	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C22	Braidcarr Rocks	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C23	Beadnell	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C24	Beadnell	Dunes	no repairs	31/12/2012	continue active monitoring	Dune management required particularly in front of the properties
121AA901A1701C25	Beadnell Haven	Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C26	Beadnell Haven		no repairs	31/12/2012	continue active monitoring	
121AA901A1701C27	Beadnell Haven	Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C28	Dell Point	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C29	Dell Point	Bank	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C30	Red Brae	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C31	Beadnell	Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C32	Beadnell	Slope	routine	31/12/2010	improve condition through maintenance	Establish management responsibilities and priorities
121AA901A1701C33	Beadnell	Wall	urgent	31/12/2010	improve condition through maintenance	Re-point masonry wall
121AA901A1701C34	Beadnell	Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C35	Beadnell	Wall	urgent	31/12/2010	further study	Investigate Strategy for frontage.
121AA901A1701C36	Beadnell	Wall	urgent	31/12/2010	improve condition through maintenance / further study	Re-point wall and localised underpinning. Investigate Strategy for frontage.
121AA901A1701C37	Beadnell	Wall	no repairs	31/12/2012	continue active monitoring / further study	Investigate Strategy for frontage.
121AA901A1701C38	Whinstone Dyke	Cliff	no repairs	31/12/2012	continue active monitoring / further study	Investigate Strategy for frontage.
121AA901A1701C39	Lady's Hole	Gabions	urgent	31/07/2011	improve condition through maintenance / further study	Repair gabions. Investigate Strategy for frontage.
121AA901A1701C40	Roan Rock	Gabions	no repairs	31/12/2012	continue active monitoring / further study	Monitor condition of gabions - replacement likely. Investigate Strategy for frontage.
121AA901A1701C41	North of Beadnell Point	Gabions	no repairs	31/12/2012	continue active monitoring / further study	Monitor condition of gabions - replacement likely. Investigate Strategy for frontage.
121AA901A1701C42	North of Beadnell Point	Revetment	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C43	Ebbe's Snook	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C44	Ebbe's Snook	Slope	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C45	Beadnell	Revetment	routine	31/12/2010	improve condition through maintenance	Repair undermining.
121AA901A1701C46	Beadnell	Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C47	Beadnell Harbour	Wall	no repairs	31/12/2012	continue active monitoring	

Defence	Location	Description	Priority	Recommended Action Date	Recommended Action	Details
121AA901A1701C48	Beadnell Harbour	Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C49	Beadnell Harbour	Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C50	Beadnell Harbour	Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C51	Beadnell Harbour	Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C52	Beadnell	Pier	no repairs	31/12/2012	continue active monitoring	
121AA901A1701C53	Benthall Links	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A1801C01	Beadnell Bay	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A1901C01	Beadnell Bay	Dunes	no repairs	31/12/2010	improve condition through maintenance	Re-point masonry wall
121AA901A1901C02	Football Hole	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A2001C01	St Mary's Bay	Coastal Slope	no repairs	31/12/2012	continue active monitoring	
121AA901A2001C02	St Mary's Bay	Sea Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A2001C03	St Mary's Bay	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A2001C04	Embleton	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A2001C05	Embleton	Coastal Slope	no repairs	31/12/2012	continue active monitoring	
121AA901A2101C01	Queen Margarets Cove	Coastal Slope	no repairs	31/12/2012	continue active monitoring	
121AA901A2101C02	Oxberry Lwa	Coastal Slope	no repairs	31/12/2012	continue active monitoring	
121AA901A2201C01	Craster Harbour	Embankment	no repairs	31/12/2012	continue active monitoring	
121AA901A2201C02	Craster Harbour	Sea Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A2201C03	Craster North Harbour Arm	Sea Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A2201C04	Craster Harbour	Sea Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A2201C05	Craster Harbour	Sea Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A2201C06	Craster Harbour	Other	no repairs	31/12/2012	continue active monitoring	
121AA901A2201C07	Craster Harbour	Coastal Slope	no repairs	31/12/2012	continue active monitoring	
121AA901A2201C08	Craster Harbour	Sea Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A2201C09	Craster Harbour	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A2201C10	Craster South Harbour Arm	Sea Wall	routine	31/12/2010	continue active monitoring	
121AA901A2201C11	Craster Harbour	Sea Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A2201C12	Muckle Carr	Sea Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A2201C13	Craster Harbour	Revetment	no repairs	31/12/2012	continue active monitoring	
121AA901A2201C14	Muckle Carr	Revetment	no repairs	31/12/2012	continue active monitoring	
121AA901A2201C15	Muckle Carr	Coastal Slope	no repairs	31/12/2012	continue active monitoring	
121AA901A2301C01	Black Hole	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A2301C02	Swine Den	Coastal Slope	no repairs	31/12/2012	continue active monitoring	
121AA901A2401C01	Swine Den	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A2401C02	Rumblink Kern	Cliff	no repairs	31/12/2012	continue active monitoring	

Defence	Location	Description	Priority	Recommended Action Date	Recommended Action	Details
121AA901A2501C01	Howick Haven	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A2501C02	Longhoughton Steel	Coastal Slope	no repairs	31/12/2012	continue active monitoring	
121AA901A2601C01	Boulmer Steel	Coastal Slope	no repairs	31/12/2012	continue active monitoring	
121AA901A2601C02	Boulmer	Revetment	no repairs	31/12/2012	continue active monitoring	
121AA901A2601C03	Berwick Stone	Embankment	urgent	31/12/2010	include in capital programme	Implement feasibility study recommendations.
121AA901A2601C04	The Torrs	Revetment	urgent	31/12/2010	include in capital programme	Implement feasibility study recommendations.
121AA901A2601C05	The Torrs	Revetment	no repairs	31/12/2012	continue active monitoring	
121AA901A2601C06	Boulmer Haven	Coastal Slope	no repairs	31/12/2012	continue active monitoring	
121AA901A2601C07	Seaton Point	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A2601C08	Seaton Point	Embankment	no repairs	31/12/2012	continue active monitoring	
121AA901A2601C09	Boulmer	Other	no repairs	31/12/2012	continue active monitoring	
121AA901A2701C01	Alnmouth	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A2701C02	Foxton Hall	Coastal Slope	no repairs	31/12/2012	continue active monitoring	
121AA901A2701C03	Marden Rocks	Coastal Slope	no repairs	31/12/2012	continue active monitoring	
121AA901A2701C04	Alnmouth	Embankment	no repairs	31/12/2012	continue active monitoring	
121AA901A2701C05	Alnmouth Bay	Revetment	no repairs	31/12/2012	continue active monitoring	Dune management.
121AA901A2701C06	Alnmouth Bay	Embankment	no repairs	31/12/2012	continue active monitoring	Dune management.
121AA901A2701C07	Alnmouth Bay	Dunes	no repairs	31/12/2012	continue active monitoring	Dune management.
121AA901A2701C08	Alnmouth Bay	Dunes	no repairs	31/12/2012	continue active monitoring	Dune management.
121AA901A2801C01	Alnmouth Bay	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A2801C02	Alnmouth Estuary	Sea Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A2801C03	Alnmouth Estuary	Sea Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A2801C04	Alnmouth Estuary	Sea Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A2801C05	Alnmouth Estuary	Access Ramp	no repairs	31/12/2012	continue active monitoring	
121AA901A2801C06	Alnmouth Estuary	Sea Wall	routine	31/12/2012	improve condition through maintenance	Local repairs to wall
121AA901A2801C07	Alnmouth Estuary	Embankment	no repairs	31/12/2012	continue active monitoring	
121AA901A2801C08	Alnmouth Estuary	Embankment	no repairs	31/12/2012	continue active monitoring	
121AA901A2801C09	Alnmouth Estuary	Embankment	no repairs	31/12/2012	continue active monitoring	
121AA901A2801C10	Alnmouth Estuary	Sea Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A2801C11	Alnmouth Estuary	Flood Plain	no repairs	31/12/2012	continue active monitoring	
121AA901A2801C12	Alnmouth Estuary	Flood Plain	no repairs	31/12/2012	continue active monitoring	
121AA901A2801C13	Church Hill	Sea Wall	routine	31/12/2012	improve condition through maintenance	Fill joints and voids.
121AA901A2901C01	Buston Links	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A2901C02	Birling Links & Warkworth Dunes	Dunes	no repairs	31/12/2012	continue active monitoring	Dune management.

Defence	Location	Description	Priority	Recommended Action Date	Recommended Action	Details
121AA901A3001C01	Warkworth Harbour, North Pier	Breakwater	no repairs	31/12/2012	continue active monitoring	
121AA901A3001C02	Warkworth Harbour, North Pier (head)	Sea Wall	urgent	31/12/2012	notify third party and seek action	Repairs needed, but no coast protection benefit.
121AA901A3001C03	Warkworth Harbour, North Pier (central)	Breakwater	routine	31/12/2012	improve condition through maintenance	Repair damage.
121AA901A3001C04	Warkworth Harbour	North Wave Basin	no repairs	31/12/2012	continue active monitoring	
121AA901A3001C05	Amble	Quay Wall	routine	31/12/2010	improve condition through maintenance	Fill small cracks and hole in deck.
121AA901A3001C06	Amble	(Quay) Wall	urgent	31/12/2010	include in capital programme	Repair failed quay.
121AA901A3001C07	South Jetty (Landward)	Revetment	routine	31/10/2010	improve condition through maintenance	Monitor and address outflanking at root.
121AA901A3001C08	Little Shore Wave Basin	Coastal Slope	routine	31/12/2010	improve condition through maintenance	Tidy-up unsightly attempt to arrest erosion.
121AA901A3001C09	Little Shore Wave Basin	Dunes	routine	31/12/2010	improve condition through maintenance	Maintenance repairs to holes in wall.
121AA901A3001C10	Little Shore Wave Basin	Sea Wall	urgent	31/12/2010	include in capital programme	Repair wall, deck and capping beam.
121AA901A3001C11	South Jetty	Jetty	no repairs	31/12/2012	continue active monitoring	
121AA901A3101C01	South Pier Head	Other	routine	31/12/2010	improve condition through maintenance	Fill cracks.
121AA901A3101C02	Amble South Pier	Sea Wall	routine	31/12/2012	improve condition through maintenance	Repointing and fill cracks. Fill missing masonry
121AA901A3101C03	Amble	Sea Wall	routine	31/12/2010	improve condition through maintenance	Minor repairs to the wall face, crest and deck. Maintenance to access steps.
121AA901A3101C04	Amble	Cliff	routine	31/12/2010	improve condition through maintenance	Repair cracks
121AA901A3101C05	Amble	Sea Wall	routine	31/12/2010	improve condition through maintenance	Repar cracks.
121AA901A3101C06	Amble	Cliff	routine	31/12/2010	improve condition through maintenance	Dune Management
121AA901A3101C07	Amble	Sea Wall	routine	31/12/2010	improve condition through maintenance	Fill gap in construction joint.
121AA901A3101C08	Amble Links	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A3101C09	Amble Links	Dunes	urgent	31/12/2010	improve condition through maintenance	Repair or removal of outfall structure
121AA901A3101C10	Wellhaugh Point	Sea Wall	no repairs	31/12/2012	continue active monitoring	Monitor erosion at northern end.
121AA901A3101C11	Amble	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A3101C12	north of Beacon Hill	Dunes	routine	31/12/2010	improve condition through maintenance	Repair/remove outfall
121AA901A3101C13	Beacon Hill	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A3101C14	Beacon Hill	Revetment	urgent	31/12/2010	include in capital programme	Implement scheme in accordance with 2007/2008 Prefeasibility study.

Defence	Location	Description	Priority	Recommended Action Date	Recommended Action	Details
121AA901A3201C01	Beacon Hill	Higher Ground	urgent	31/12/2010	include in capital programme	Implement scheme in accordance with 2007/2008 Prefeasibility Study.
121AA901A3201C02	Hauxley Links	Revetment	no repairs	31/12/2012	continue active monitoring	
121AA901A3201C03	Hauxley Links	Revetment	no repairs	31/12/2012	continue active monitoring	Clear bicycle frame from revetment.
121AA901A3201C04	Hauxley Links	Revetment/Embankment	routine	31/12/2010	improve condition through maintenance	Resit blocks and fill gaps.
121AA901A3201C05	Hauxley Links	Revetment	routine	31/12/2010	improve condition through maintenance	Remove/repair outfall
121AA901A3201C06	Hauxley Nature Reserve	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A3201C07	Hauxley Nature Reserve	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A3201C08	Hauxley Nature Reserve	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A3201C09	Togston Links	Breakwater	urgent	31/12/2010	improve condition through maintenance	Re-fix cover to seaward end of outfall for health and safety reasons.
121AA901A3201C10	Togston Links	Dunes	routine	31/12/2010	continue active monitoring	Monitor erosion of dunes.
121AA901A3201C11	Togston Links	Dunes	routine	31/12/2010	continue active monitoring	Monitor erosion of dunes
121AA901A3201C12	Hadston Carrs	Outfall	routine	31/12/2010	improve condition through maintenance	Fill gaps and voids between slipway and outfall south wall
121AA901A3201C13	Druridge Bay	Revetment	no repairs	31/12/2012	continue active monitoring	
121AA901A3201C14	Druridge Bay	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A3201C15	Chiburn Links	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A3201C16	Cresswell	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A3201C17	Cresswell	Revetment	no repairs	31/12/2012	continue active monitoring	
121AA901A3201C18	Cresswell	Sea Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A3201C19	Cresswell	Revetment	no repairs	31/12/2012	continue active monitoring	Monitor settlement for signs of worsening.
121AA901A3201C20	Cresswell	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A3201C21	Cresswell	Dunes	no repairs	31/12/2012	continue active monitoring	
121AA901A3201C22	Cresswell	Cliff/Embankment	urgent	31/12/2010	improve condition through maintenance	Repair and extend gabions/investigate alternative solutions.
121AA901A3301C01	Snab Point	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A3301C02	Headagee	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A3401C01	Lynemouth	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A3401C05	Lynemouth	Cliff	routine	31/12/2012	improve condition through maintenance	Maintain burn outlet to sea. Monitor erosion.
121AA901A3401C06	Lynemouth	Embankment	no repairs	31/12/2012	continue active monitoring	Consider environmental impacts.
121AA901A3401C07	Lynemouth Power Station	Revetment	no repairs	31/12/2012	continue active monitoring	
121AA901A3401C08	Lyne Sands	Embankment	no repairs	31/12/2012	continue active monitoring	

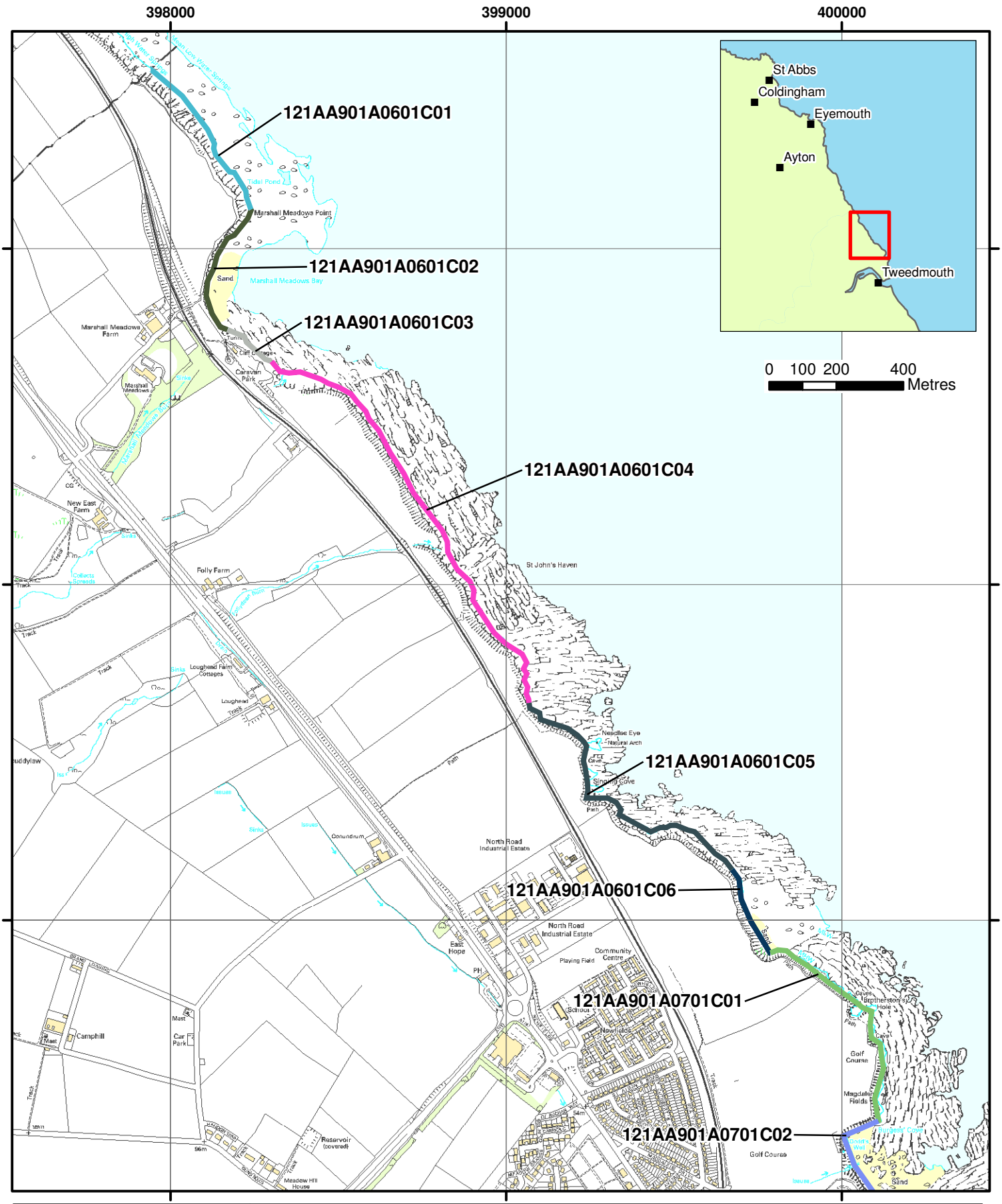
Defence	Location	Description	Priority	Recommended Action Date	Recommended Action	Details
121AA901A3501C01	Lyne Sands	Coastal Slope	no repairs	31/12/2012	continue active monitoring	
121AA901A3501C11	Beacon Point	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A3501C03	Beacon Point	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A3501C04	Whitehole Skears	Cliff	no repairs	31/12/2012	notify third party and seek action	Reconfigure golf course as necessary
121AA901A3501C05	Newbiggin Point	Cliff	no repairs	31/12/2012	continue active monitoring	Cliff top monitoring
121AA901A3501C06	Dolls Carrs	Revetment	no repairs	31/12/2012	continue active monitoring	Cliff top monitoring
121AA901A3501C07	Dolls Carrs	Cliff	no repairs	31/12/2012	continue active monitoring	Cliff top monitoring
121AA901A3501C08	Newbiggin Point	Sea Wall	urgent	31/12/2012	improve condition through maintenance	Works to stop outflanking and undermining.
121AA901A3501C09	Newbiggin Point	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A3501C10	Newbiggin Point	Sea Wall	urgent	31/12/2010	improve condition through maintenance	Repair wall
121AA901A3601C01	Newbiggin Point	Cliff	urgent	31/12/2010	improve condition through maintenance	Repair/stabilisation of the vegetated slope & repair/replacement of masonry wall
121AA901A3601C12	Little Bay	Sea Wall	routine	31/12/2010	improve condition through maintenance	Repairs to wall and replacement of hand rail.
121AA901A3601C13	Church Point	Sea Wall	routine	31/12/2010	improve condition through maintenance	Repointing
121AA901A3601C14	Hully Rocks	Breakwater	no repairs	31/12/2012	continue active monitoring	
121AA901A3601C15	Newbiggin	Revetment	no repairs	31/12/2012	continue active monitoring	Monitor beach changes following scheme.
121AA901A3601C06	Newbiggin Bay	Sea Wall	no repairs	31/12/2012	continue active monitoring	Monitor beach changes following scheme.
121AA901A3601C07	Newbiggin Bay	Sea Wall	no repairs	31/12/2012	continue active monitoring	Works to stop outflanking and undermining. Monitor beach levels following scheme.
121AA901A3601C08	Newbiggin Bay	Revetment	no repairs	31/12/2012	continue active monitoring	Monitor beach levels following scheme.
121AA901A3601C09	Spital Carrs	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A3601C10	Spital Point	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A3601C11	Black Score	Revetment	no repairs	31/12/2012	continue active monitoring	
121AA901A3701C01	Links Quarry	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A3701C02	North Seaton Links	Cliff	no repairs	31/12/2012	continue active monitoring	Close off footpath and place warning signs
121AA901A3701C03	North Seaton Links	Breakwater	no repairs	31/12/2012	continue active monitoring	Cliff top monitoring.
121AA901A3801C01	North Bank River Wansbeck	Embankment	no repairs	31/12/2012	continue active monitoring	
121AA901A3801C02	South Bank River Wansbeck	Embankment	no repairs	31/12/2012	continue active monitoring	
121AA901A3901C01	Cambois Links	Cliff	no repairs	31/12/2012	further studies required	Monitoring cliff recession. Consider management options.

Defence	Location	Description	Priority	Recommended Action Date	Recommended Action	Details
121AA901A3901C05	Cambois Links	Revetment	no repairs	31/12/2012	continue active monitoring	
121AA901A3901C03	Cambois Links	Cliff	no repairs	31/12/2012	continue active monitoring	Monitor erosion at northern end for signs of outflanking of revetment.
121AA901A3901C04	The Rockers	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A4001C01	North Beach	Revetment	routine	31/12/2012	improve condition through maintenance	Repair gabions as they split.
121AA901A4001C02	Shinny Gripe Lug	Revetment	routine	31/12/2012	improve condition through maintenance	Repair damaged breastwork.
121AA901A4001C03	Alcan Reclaim	Sea Wall	routine	31/12/2012	improve condition through maintenance	Repair damaged breastwork.
121AA901A4001C04	Crab Law	Sea Wall	urgent	31/12/2010	notify third party and seek action	Detailed assessment of failiure of crest wall to southern end.
121AA901A4001C05	Blyth East Pier	Breakwater	no repairs	31/12/2012	continue active monitoring	
121AA901A4201C10	West Pier, Blyth	Sea Wall	routine	31/12/2010	improve condition through maintenance	Minor repairs to cracks, strongbacks and footings.
121AA901A4201C11	South Beach	Sea Wall	routine	31/12/2010	improve condition through maintenance	Dune replenishment and wall repairs
121AA901A4201C03	South Beach	Dunes	routine	31/12/2010	improve condition through maintenance	Repair Gabions.
121AA901A4201C04	South Beach	Sea Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A4201C05	Beach Gardens	Sea Wall	routine	31/12/2010	improve condition through maintenance	Fill cracks.
121AA901A4201C06	Promenade	Sea Wall	routine	31/12/2010	improve condition through maintenance	Repair cracks and areas of concrete corrosion.
121AA901A4201C07	Blyth Links	Sea Wall	routine	31/12/2010	improve condition through maintenance	Repair abrasion and fill cracks and gaps.
121AA901A4201C08	Fort House	Sea Wall	no repairs	31/12/2012	continue active monitoring	Monitor.
121AA901A4301C01	Blyth Cemetry	Dunes	routine	31/12/2010	improve condition through maintenance	Further dune management and stabilisation
121AA901A4301C02	Hartley Links	Dunes	routine	31/12/2010	improve condition through maintenance	Periodic replenishment.
121AA901A4401C01	Sandy Island	Sea Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A4401C02	Sandy Island	Sea Wall	routine	31/12/2010	improve condition through maintenance	Repair timber groyne and fill gaps in backing infill under deck.
121AA901A4401C03	Sandy Island	Sea Wall	routine	31/12/2010	improve condition through maintenance	Fill gaps in backing infill under deck.
121AA901A4401C04	Seaton Burn	Sea Wall	routine	31/12/2010	improve condition through maintenance	Clear sand from crest. Re-pointing of joints.
121AA901A4401C05	Seaton Burn	Sea Wall	routine	31/12/2010	improve condition through maintenance	Repair to side wall of launch ramp and access steps.
121AA901A4401C06	Seaton Burn	Sea Wall	urgent	31/12/2010	improve condition through maintenance	Rebuild concrete beam. Reinstate missing blockwork. Repoint
121AA901A4401C07	Seaton Burn	Sea Wall	routine	31/12/2010	improve condition through maintenance	Repair masonry wall.
121AA901A4401C08	Seaton Burn	Sea Wall	routine	31/12/2010	improve condition through maintenance	Repair hole. Repoint minor gaps and voids.

Defence	Location	Description	Priority	Recommended Action Date	Recommended Action	Details
121AA901A4401C09	Rocky Island	Revetment	no repairs	31/12/2012	continue active monitoring	
121AA901A4401C10	Rocky Island	Sea Wall	no repairs	31/12/2012	continue active monitoring	
121AA901A4401C11	Rocky Island	Sea Wall	urgent	31/12/2010	improve condition through maintenance	Replacement of eroded blocks. Stabilise eroding land behind wall.
121AA901A4401C12	Rocky Island	Cliff	no repairs	31/12/2012	continue active monitoring	Cliff near Watch House could be stabilised using soil nailing techniques.
121AA901A4401C13	Collywell Bay	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A4401C14	Collywell Bay	Sea Wall	routine	31/12/2010	improve condition through maintenance	Fill cracks and replace wailing.
121AA901A4401C15	Collywell Bay	Sea Wall	routine	31/12/2010	improve condition through maintenance	Fill crack.
121AA901A4401C16	Collywell Bay	Sea Wall	no repairs		continue active monitoring	
121AA901A4401C17	Collywell Bay	Sea Wall	routine	31/12/2010	improve condition through maintenance	Repoint cracks. Cover rebar. Protect toe.
121AA901A4401C18	Collywell Bay	Sea Wall	routine	31/12/2010	improve condition through maintenance	Repointing.
121AA901A4401C19	Collywell Bay	Gabions	routine	31/12/2010	improve condition through maintenance	Replace/repair gabions. Address ramp undermining and outflanking.
121AA901A4401C20	Collywell Bay	Cliff	no repairs	31/12/2012	continue active monitoring	
121AA901A4401C21	Crag Point	Cliff	no repairs	31/12/2012	continue active monitoring	

Appendices

Appendix A
Asset Locations



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Asset location

NFCDD Asset Number

Client: North East Coastal Group
Project: Cell 1 Regional Coastal Monitoring Programme

Figure 1 - Map 1 Northumberland County Council Frontage

Asset Inspection Report 2010

Drawing Scale 1:15,000 at A4

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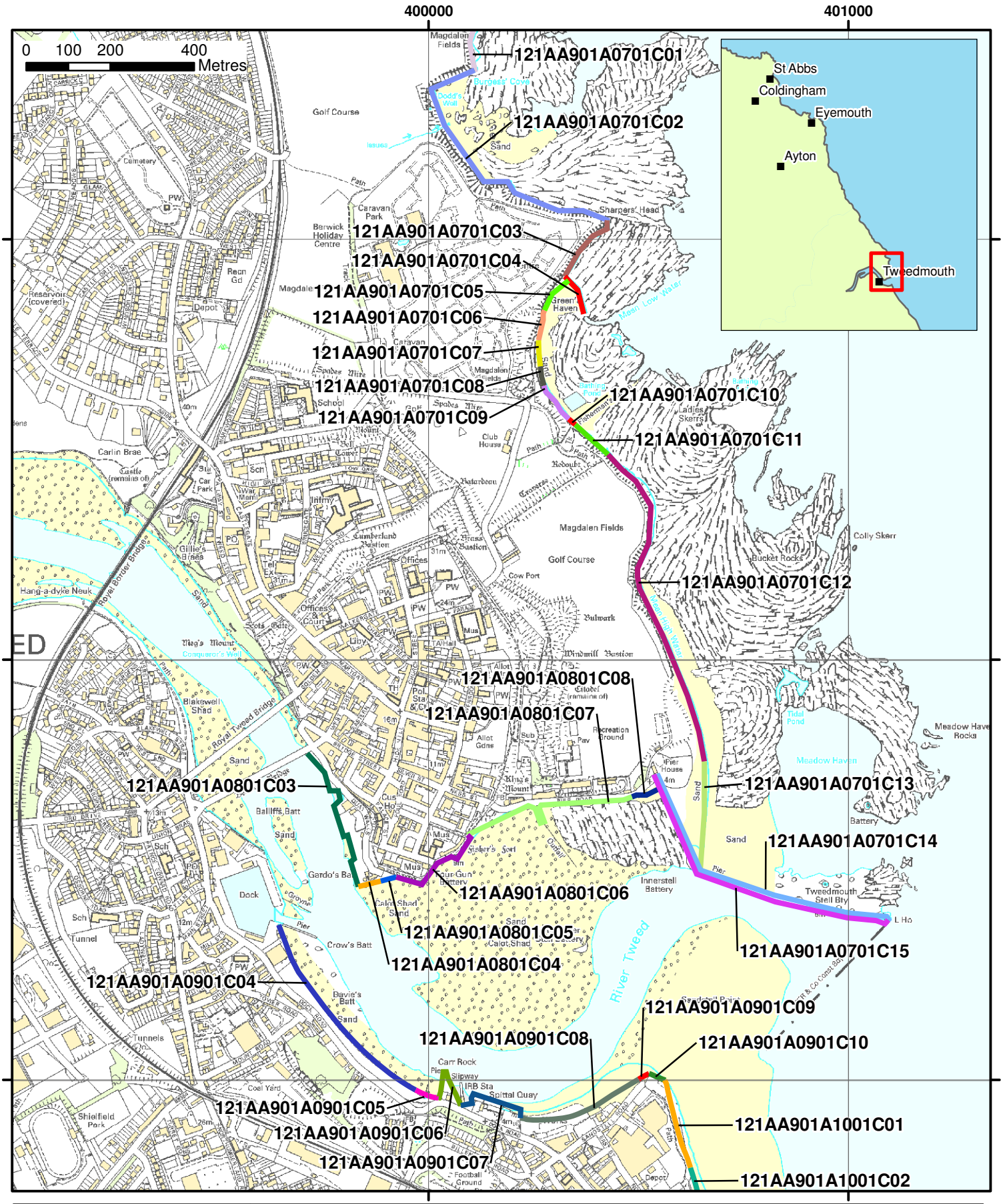

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Asset location

NFCDD Asset Number

Client: North East Coastal Group
Project: Cell 1 Regional Coastal Monitoring Programme

Figure 1 - Map 2 Northumberland County Council Frontage

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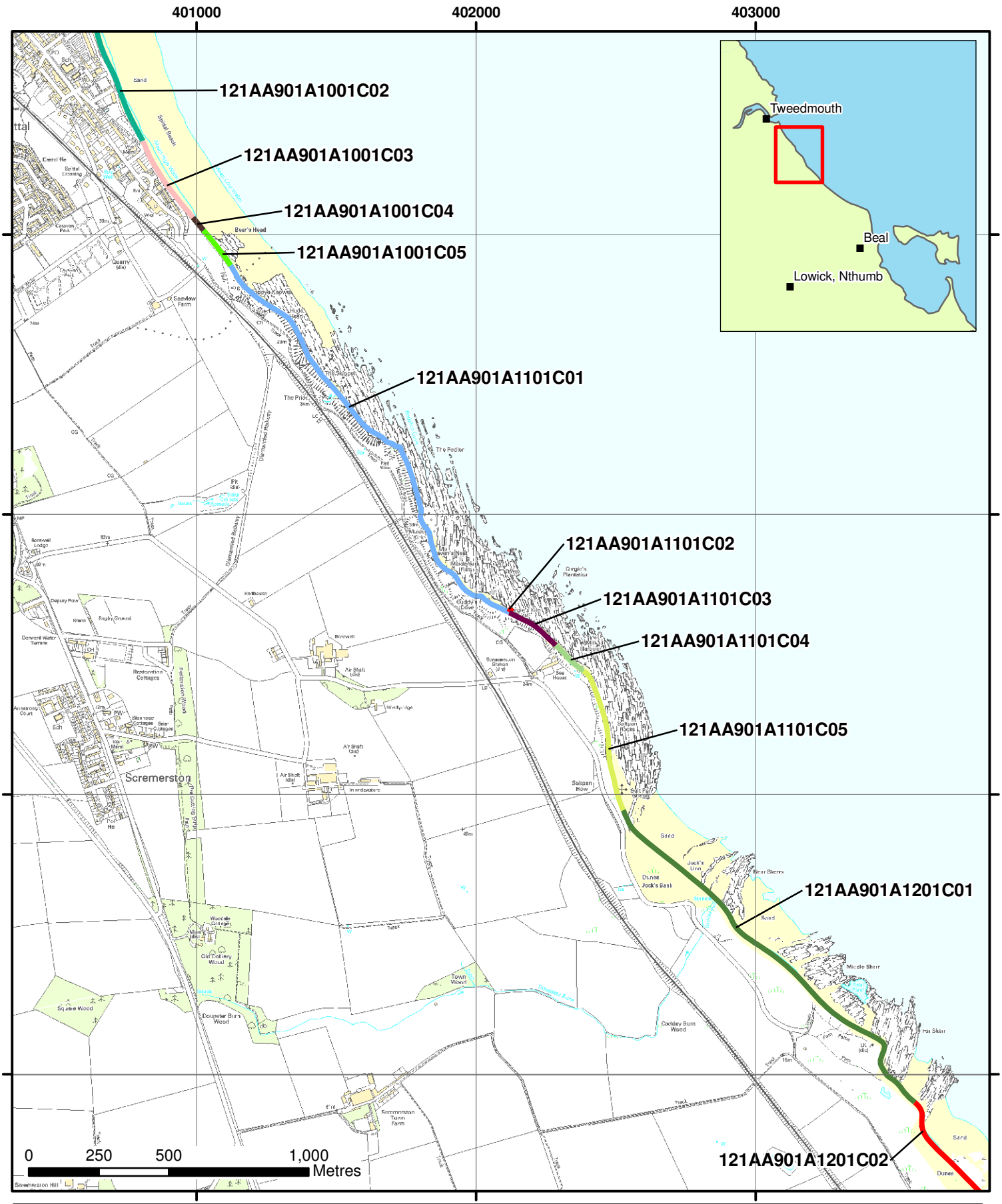

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Asset location

NFCDD Asset Number

Client: North East Coastal Group
Project: Cell 1 Regional Coastal Monitoring Programme

Figure 1 - Map 3 Northumberland County Council Frontage

Asset Inspection Report 2010

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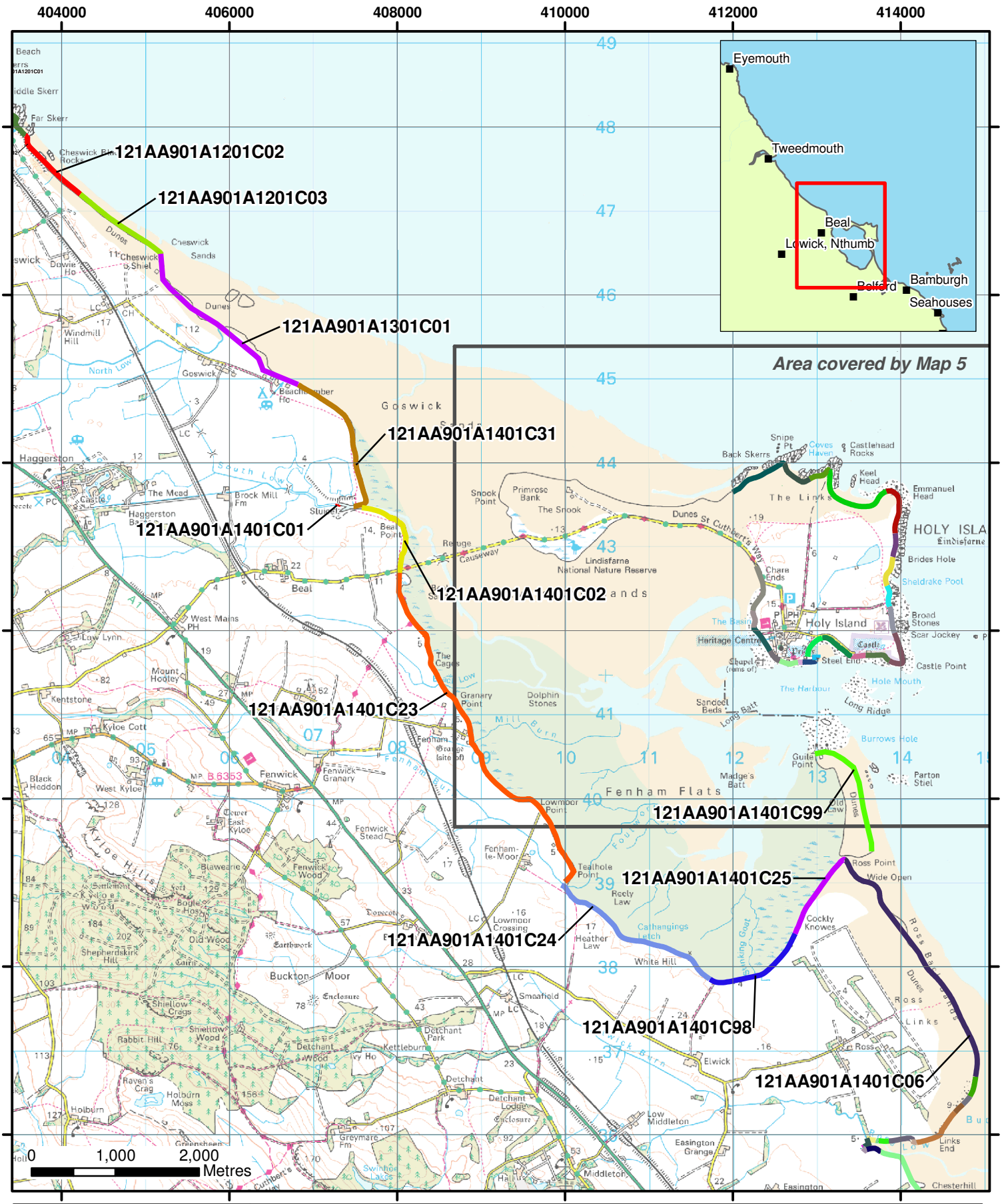

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Asset location

NFCDD Asset Number

Client: North East Coastal Group
Project: Cell 1 Regional Coastal Monitoring Programme

Figure 1 - Map 4 Northumberland County Council Frontage

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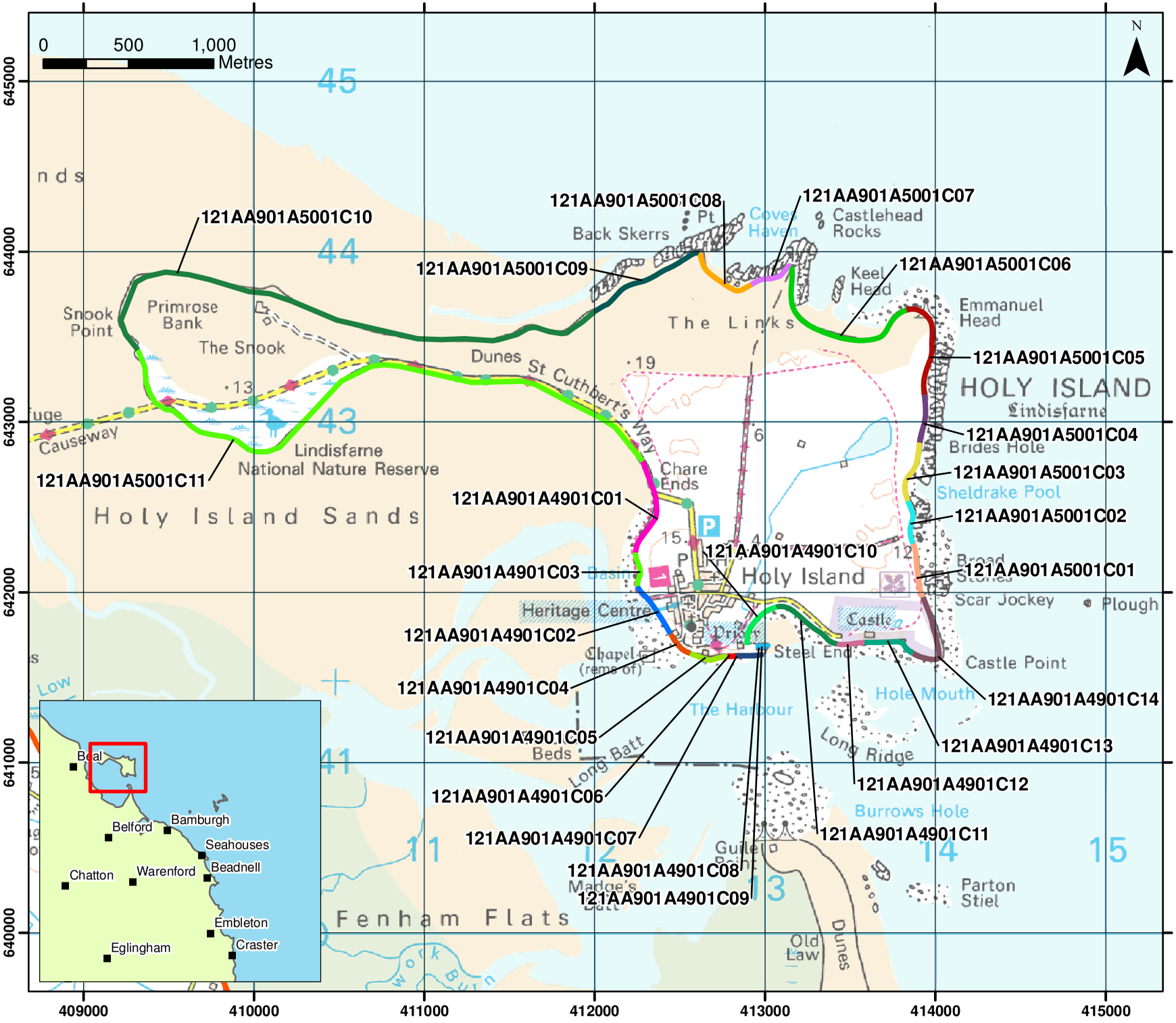

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Asset location

NFCDD Asset Number

Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

Figure 1 - Map 5 Northumberland County Council Frontage

Asset Inspection Report 2010

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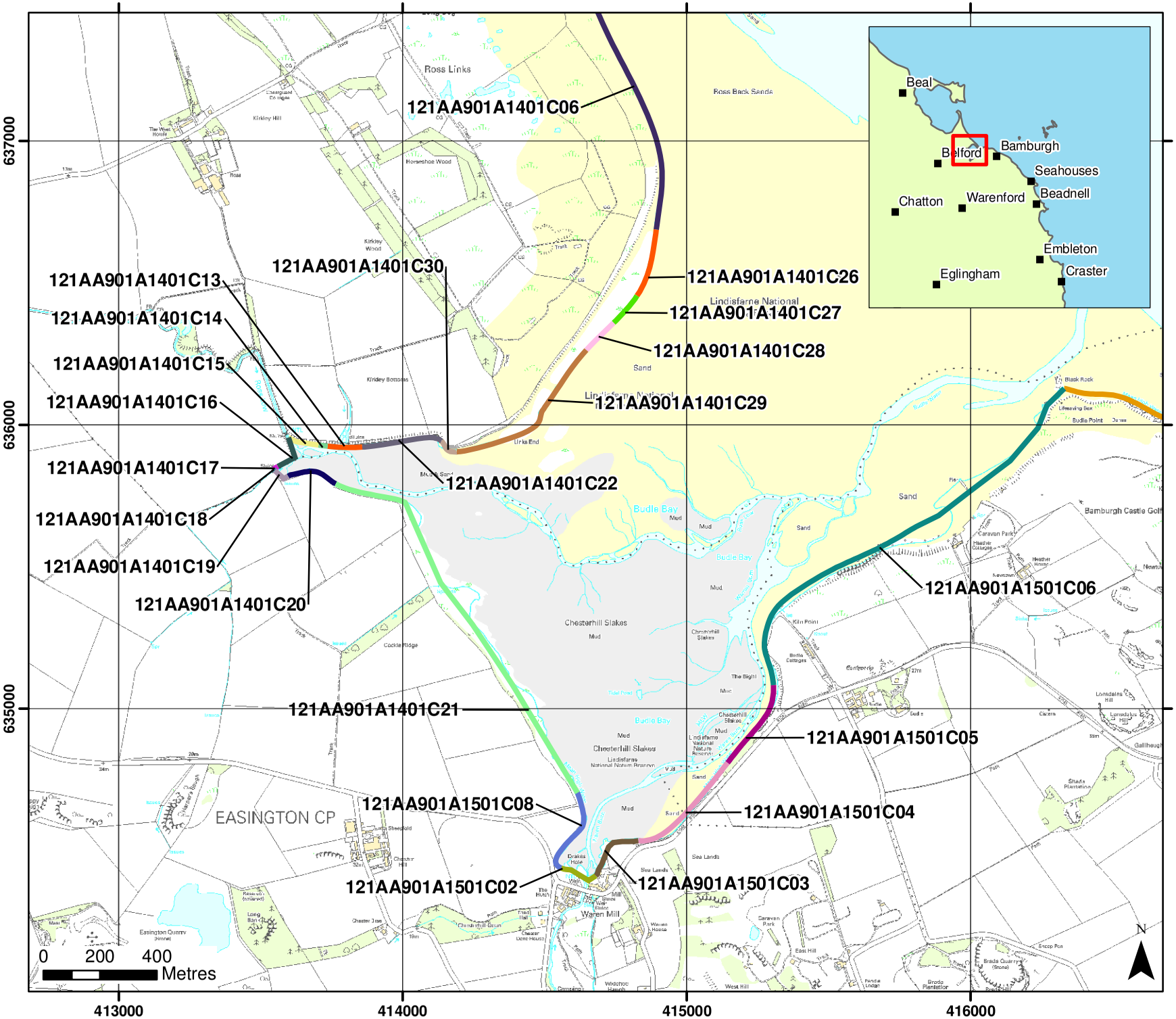

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Asset location

NFCDD Asset Number

Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

Figure 1 - Map 6 Northumberland County Council Frontage

Asset Inspection Report 2010

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Asset location

NFCDD Asset Number

Client: North East Coastal Group
Project: Cell 1 Regional Coastal Monitoring Programme

Figure 1 - Map 7 Northumberland County Council Frontage

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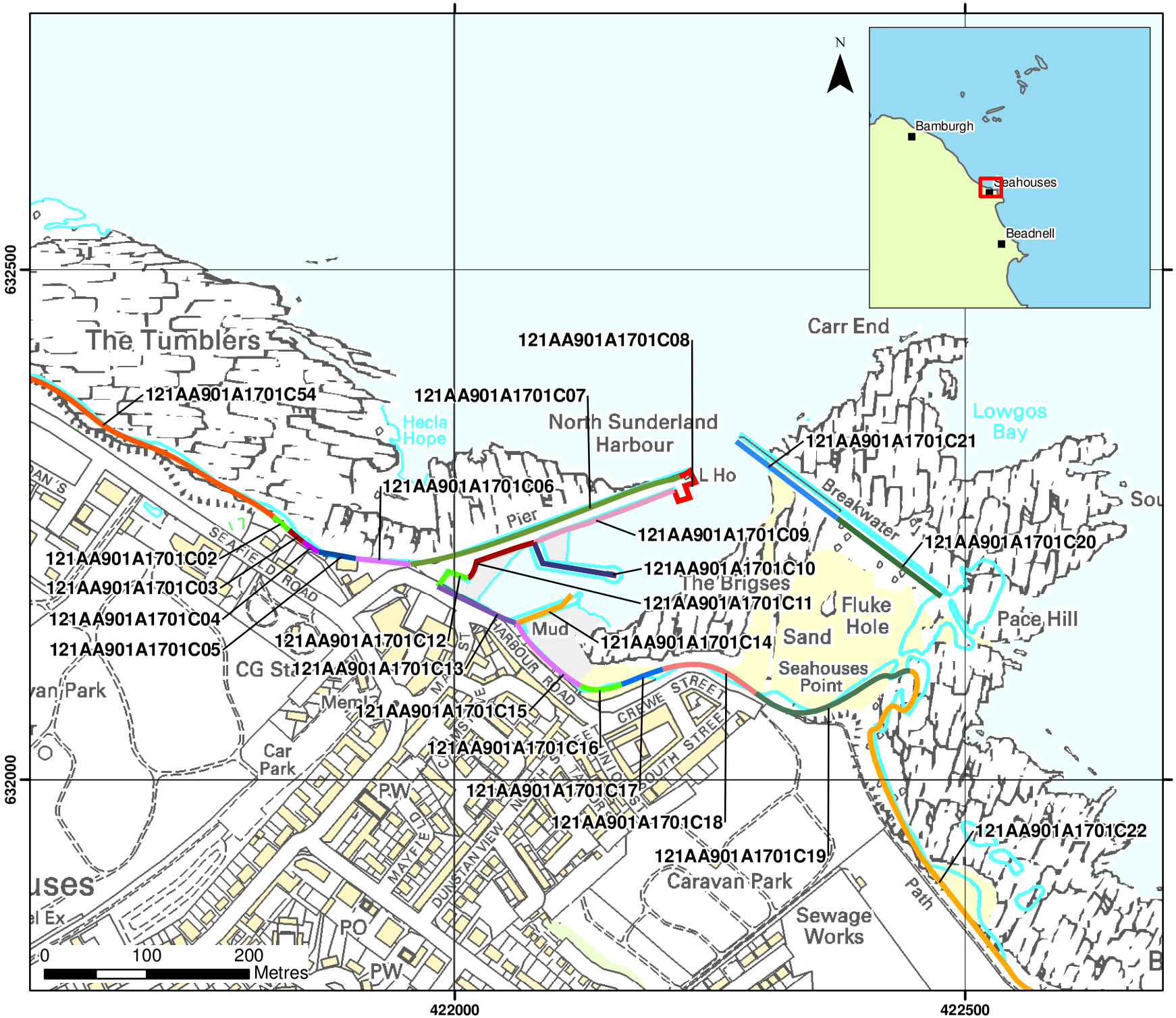

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Asset location

NFCDD Asset Number

Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

Figure 1 - Map 8 Northumberland County Council Frontage

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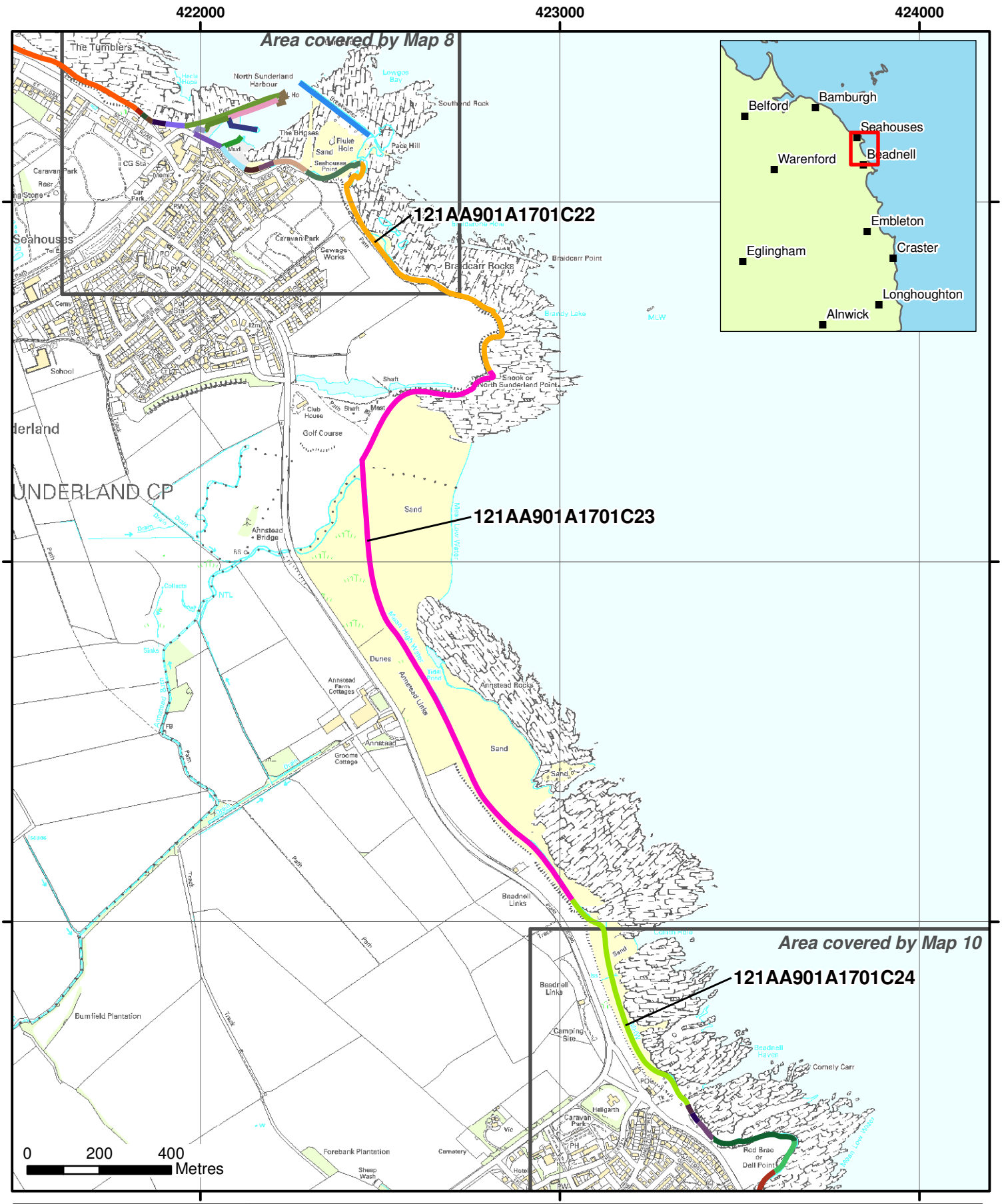

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Asset location

NFCDD Asset Number

Client: North East Coastal Group
Project: Cell 1 Regional Coastal Monitoring Programme

Figure 1 - Map 9 Northumberland County Council Frontage

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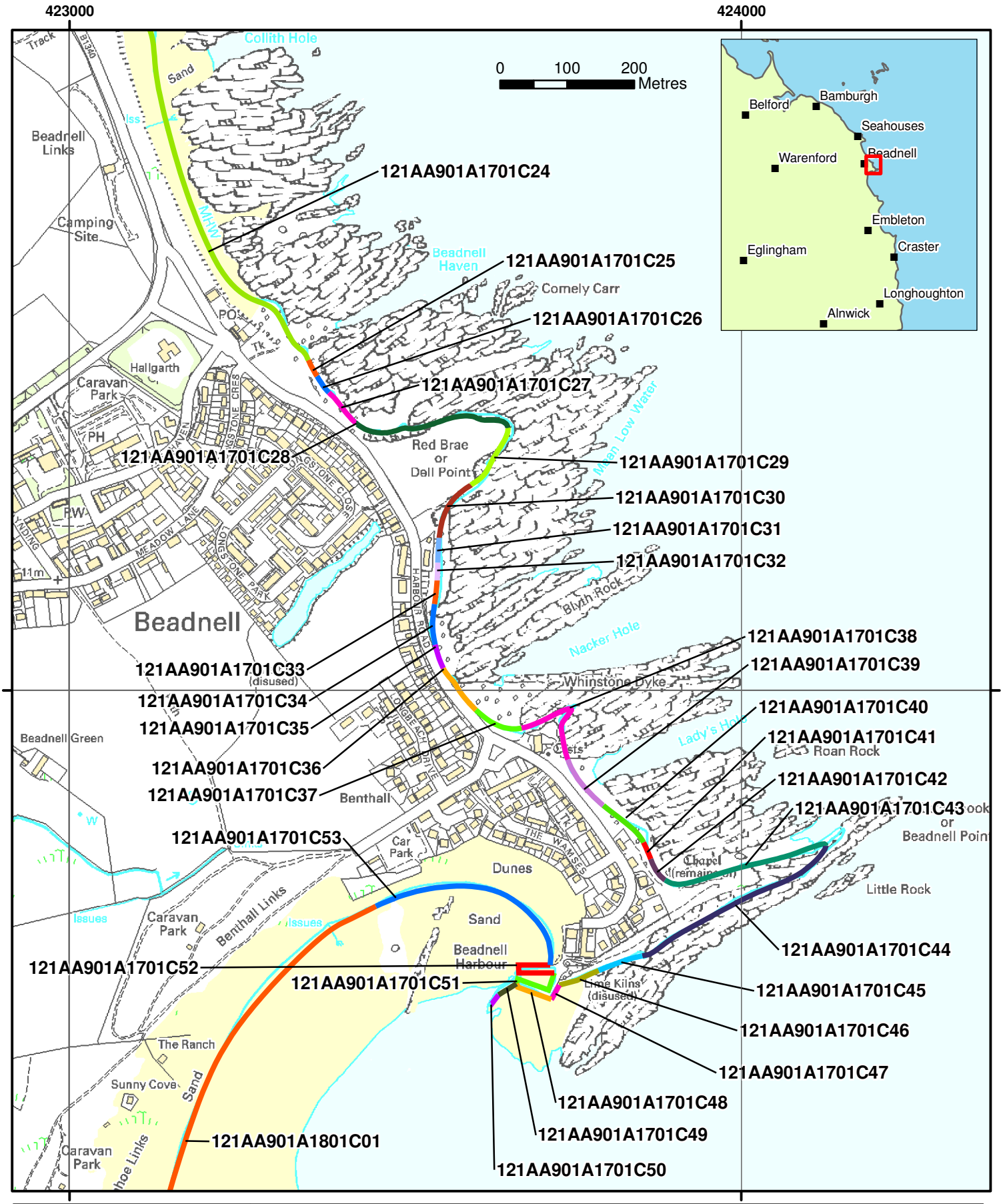

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Asset location

NFCDD Asset Number

Client: North East Coastal Group
Project: Cell 1 Regional Coastal Monitoring Programme

Figure 1 - Map 10 Northumberland County Council Frontage

Asset Inspection Report 2010

Drawing Scale 1:7,500 at A4

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Asset location

NFCDD Asset Number

Client: North East Coastal Group
Project: Cell 1 Regional Coastal Monitoring Programme

Figure 1 - Map11 Northumberland County Council Frontage

Asset Inspection Report 2010

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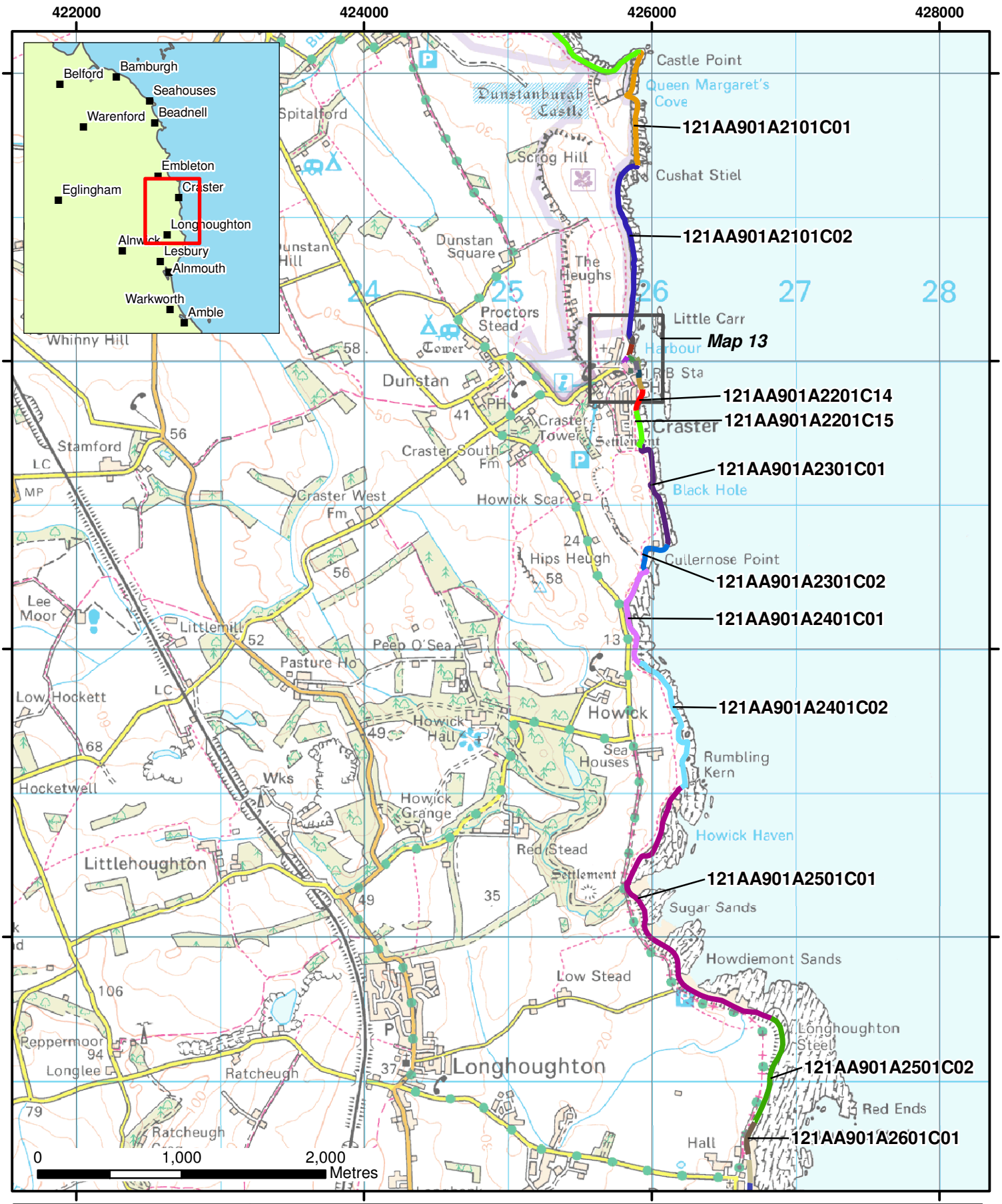

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Asset location

NFCDD Asset Number

Client: North East Coastal Group
Project: Cell 1 Regional Coastal Monitoring Programme

Figure 1 - Map12 Northumberland County Council Frontage

Asset Inspection Report 2010

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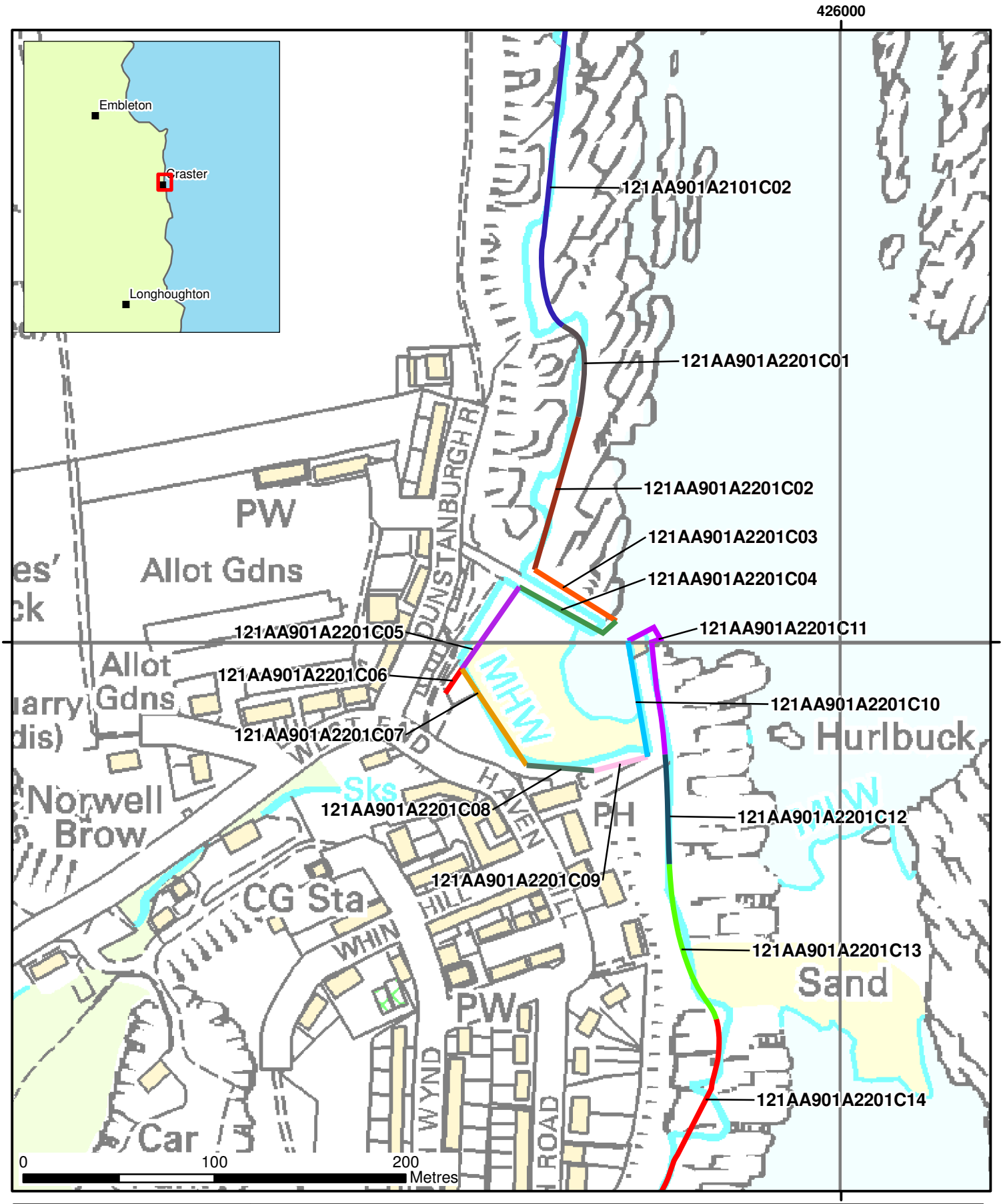

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Asset location

NFCDD Asset Number

Client: North East Coastal Group
Project: Cell 1 Regional Coastal Monitoring Programme

Figure 1 - Map13 Northumberland County Council Frontage

Asset Inspection Report 2010

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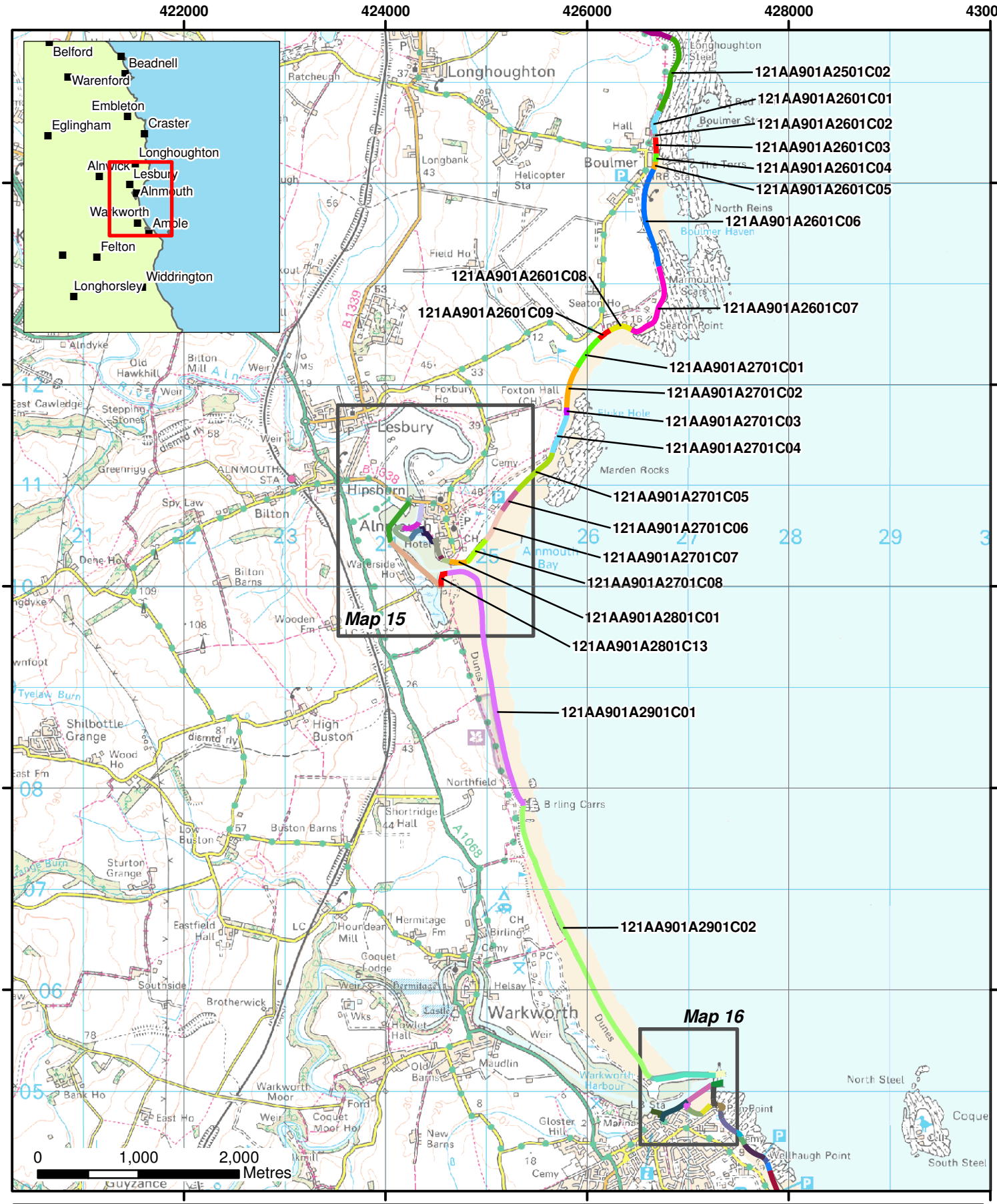

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Asset location

NFCDD Asset Number

Client: North East Coastal Group
Project: Cell 1 Regional Coastal Monitoring Programme

Figure 1 - Map14 Northumberland County Council Frontage

Asset Inspection Report 2010

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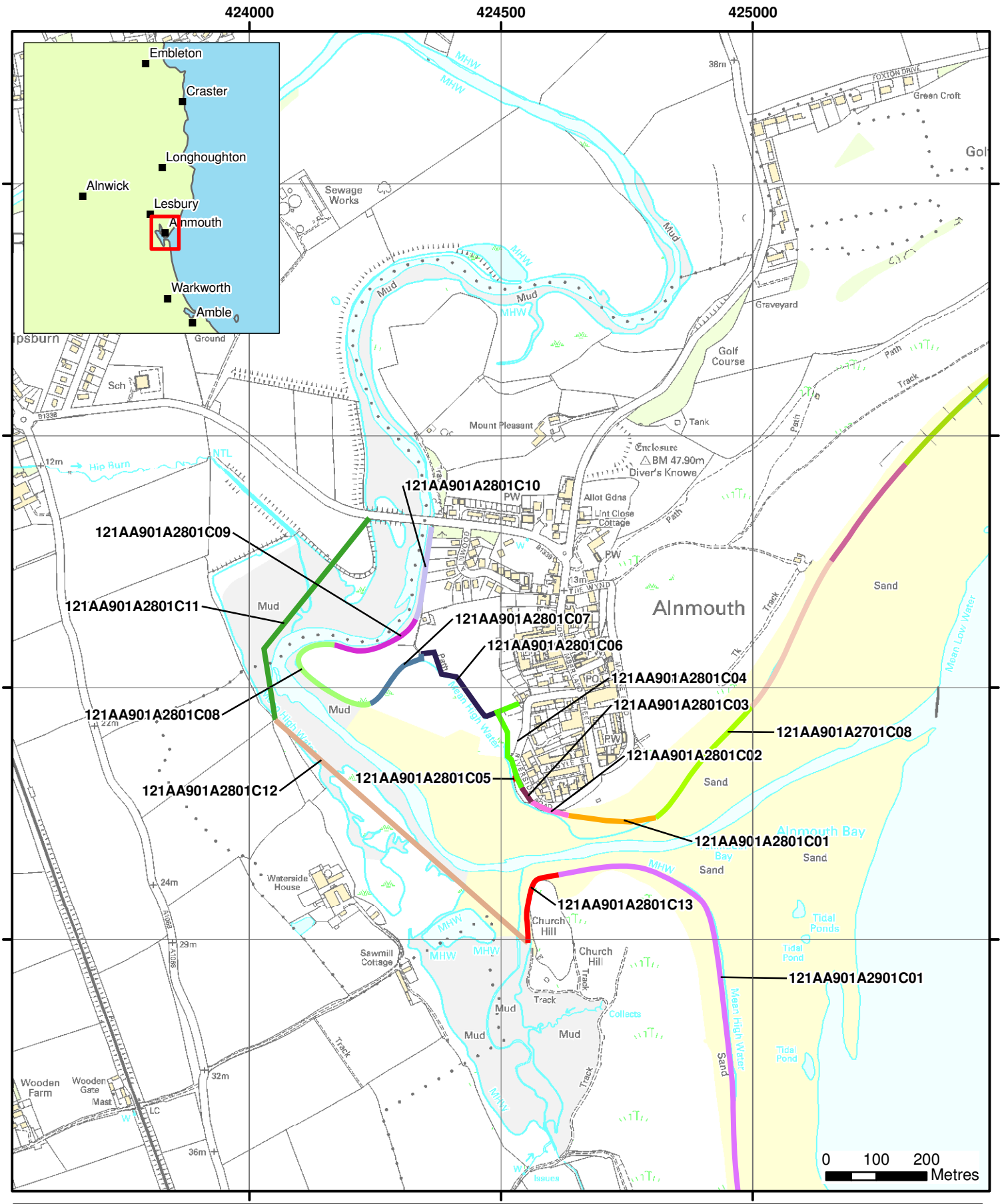

Legend

Asset location

NFCDD Asset Number

Client: North East Coastal Group
Project: Cell 1 Regional Coastal Monitoring Programme

Figure 1 - Map15 Northumberland County Council Frontage

Asset Inspection Report 2010

Drawing Scale 1:50,000 at A4

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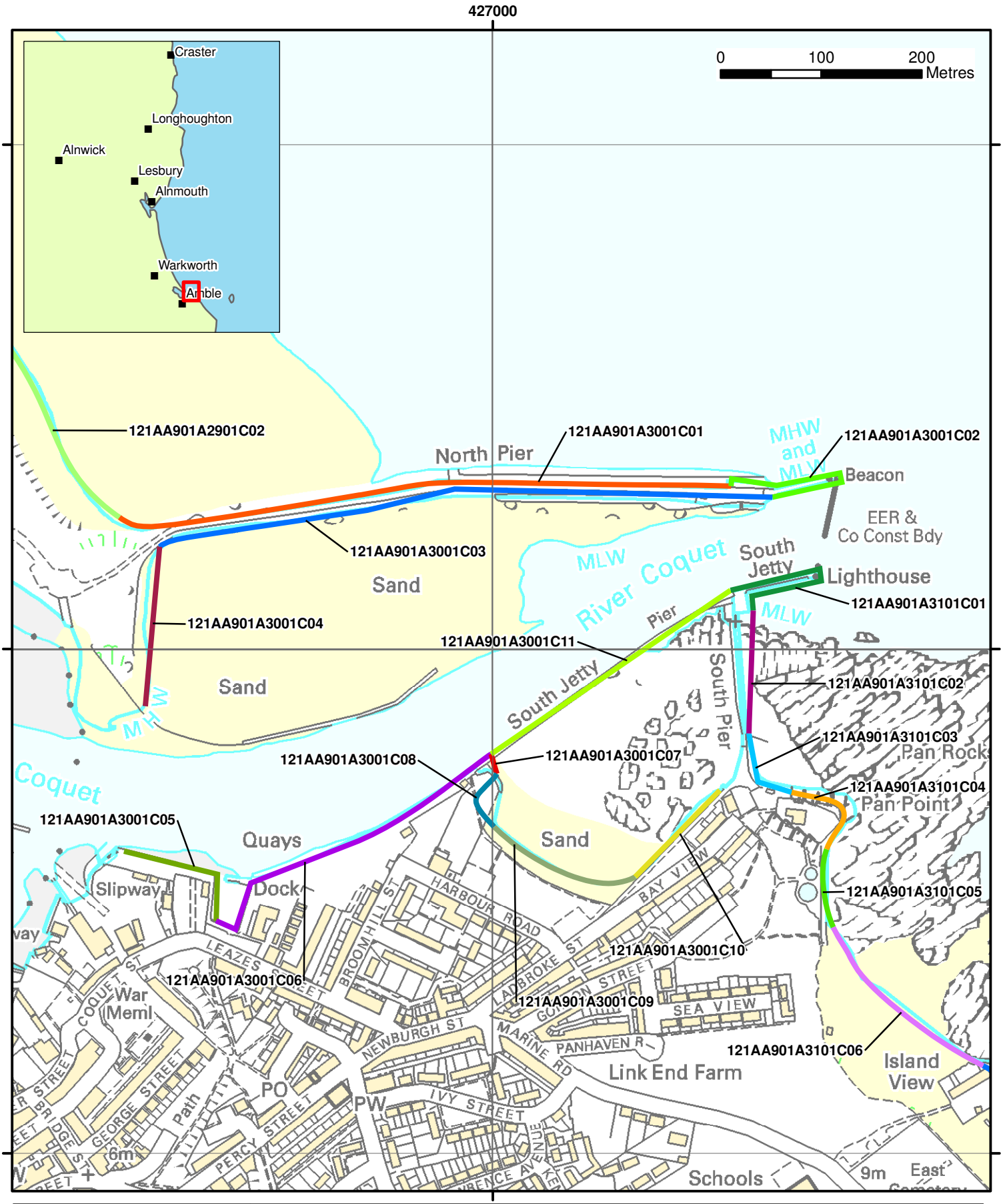

Legend

Asset location

NFCDD Asset Number

Client: North East Coastal Group
Project: Cell 1 Regional Coastal Monitoring Programme

Figure 1 - Map16 Northumberland County Council Frontage

Asset Inspection Report 2010

Drawing Scale 1:5,000 at A4

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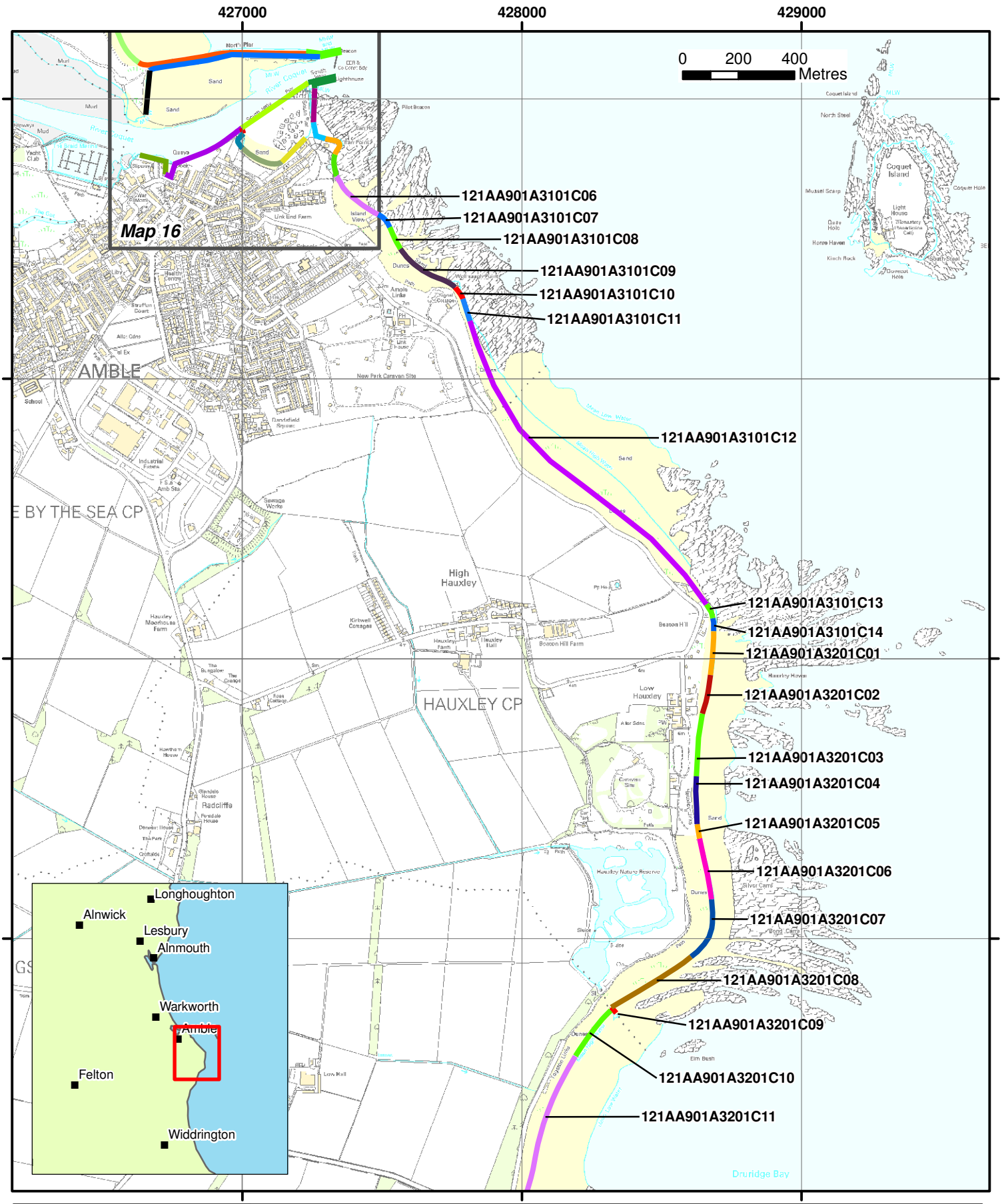

Legend

Asset location

NFCDD Asset Number

Client: North East Coastal Group
Project: Cell 1 Regional Coastal Monitoring Programme

Figure 1 - Map17 Northumberland County Council Frontage

Asset Inspection Report 2010

Drawing Scale 1:18,000 at A4

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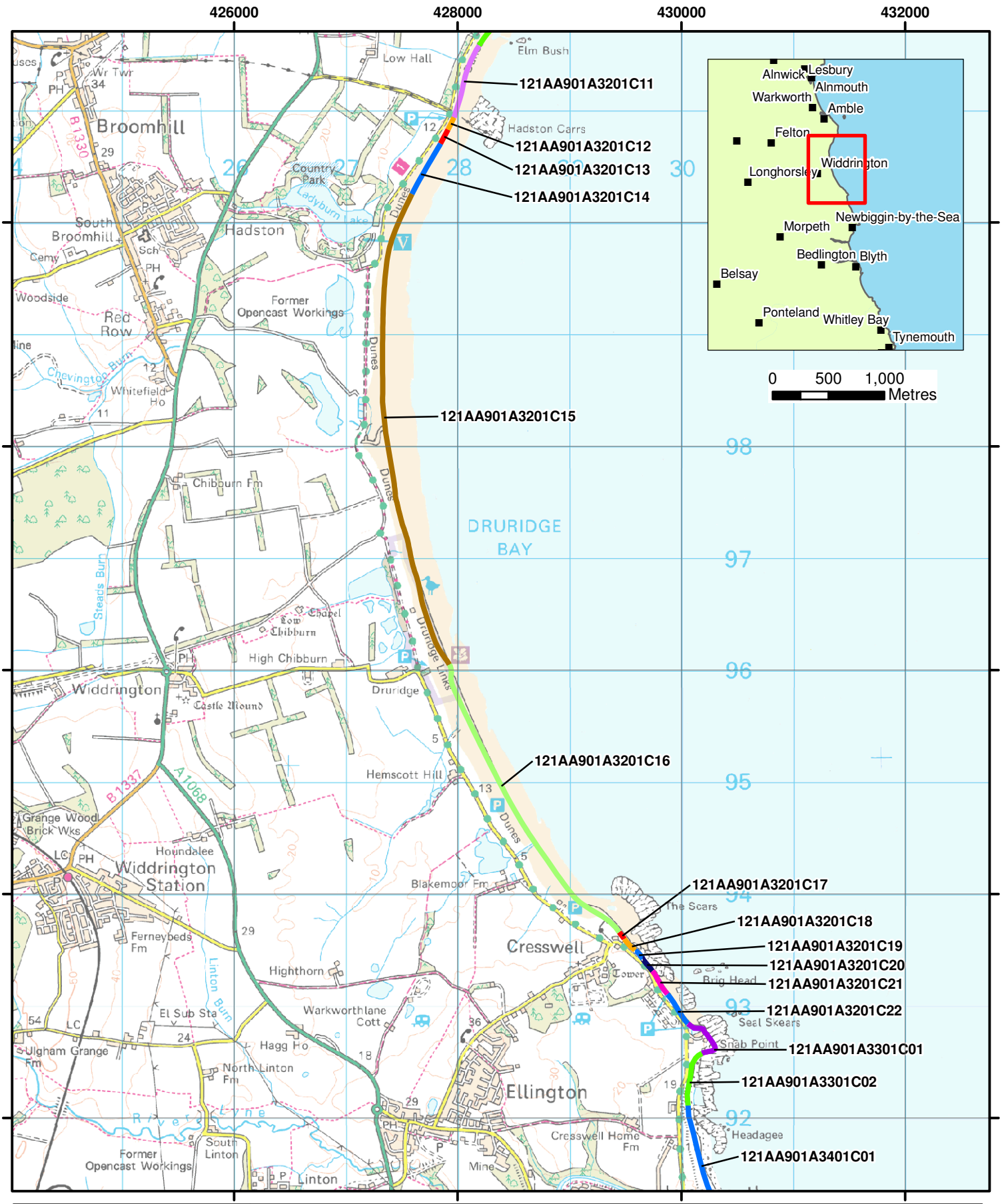

Legend

Asset location

NFCDD Asset Number

Client: North East Coastal Group
Project: Cell 1 Regional Coastal Monitoring Programme

Figure 1 - Map18 Northumberland County Council Frontage

Asset Inspection Report 2010

Drawing Scale 1:45,000 at A4

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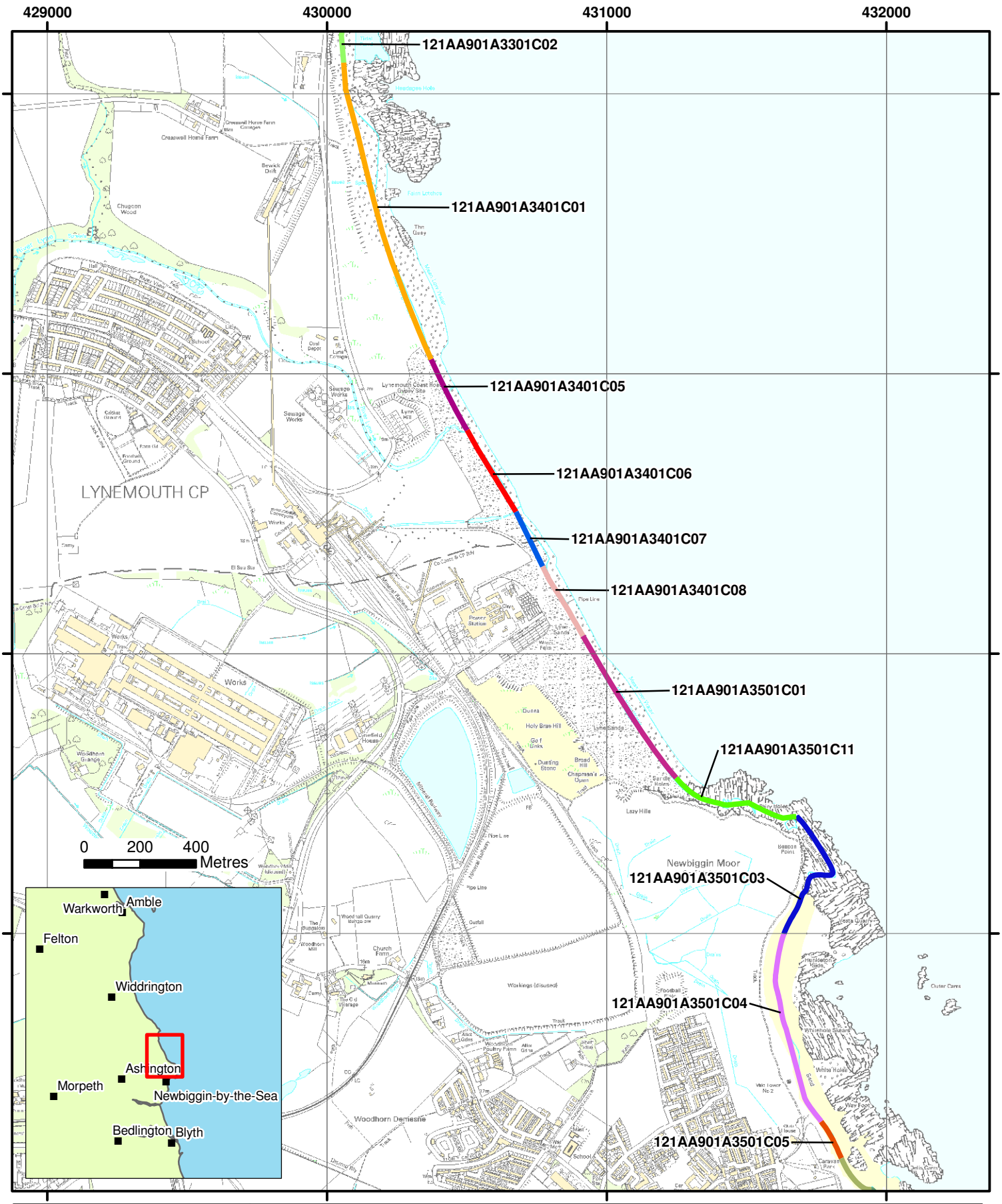

Legend

Asset location

NFCDD Asset Number

Client: North East Coastal Group
Project: Cell 1 Regional Coastal Monitoring Programme

Figure 1 - Map19 Northumberland County Council Frontage

Asset Inspection Report 2010

Drawing Scale 1:18,000 at A4

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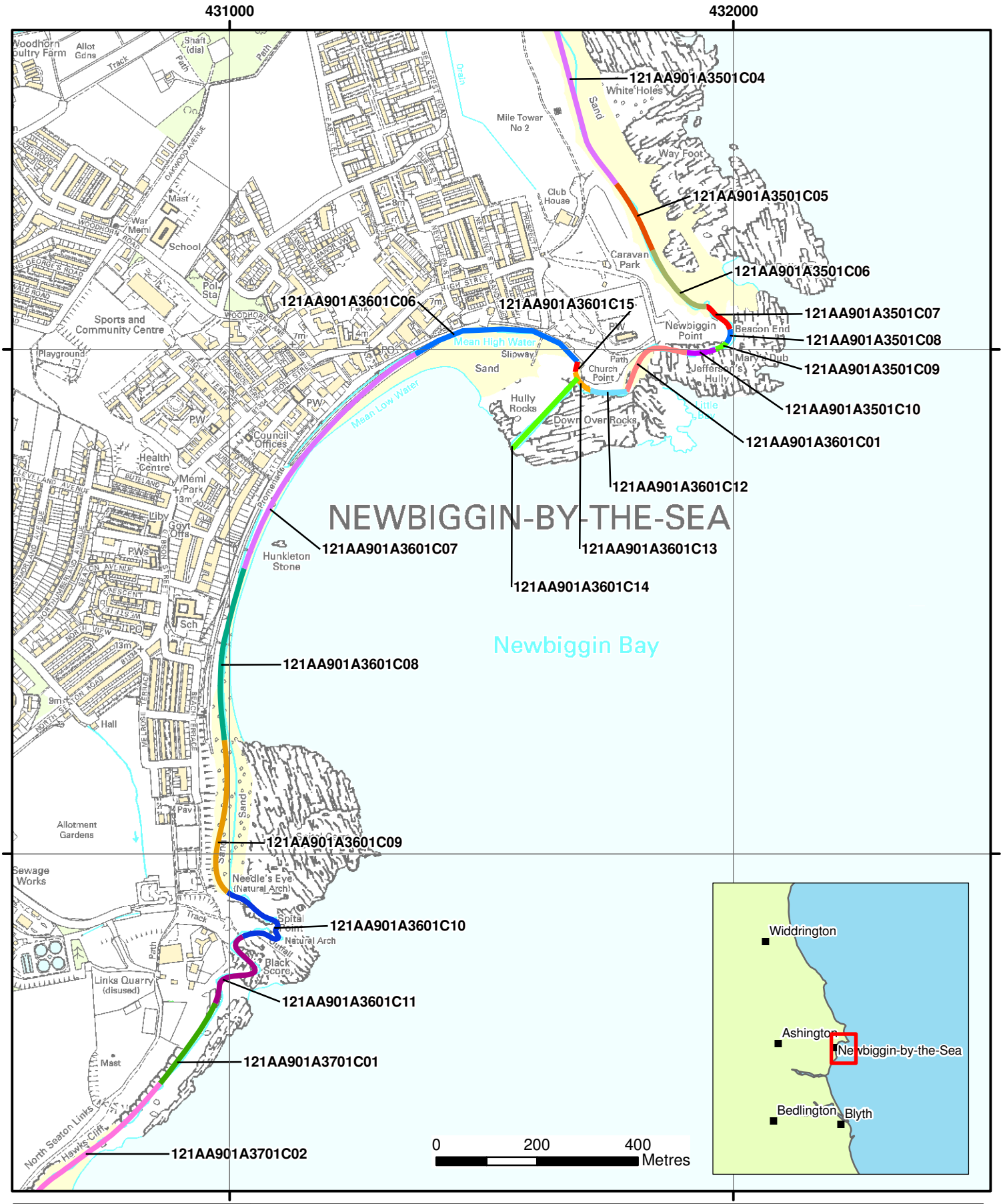

Legend

Asset location

NFCDD Asset Number

Client: North East Coastal Group
Project: Cell 1 Regional Coastal Monitoring Programme

Figure 1 - Map 20 Northumberland County Council Frontage

Asset Inspection Report 2010

Drawing Scale 1:18,000 at A4

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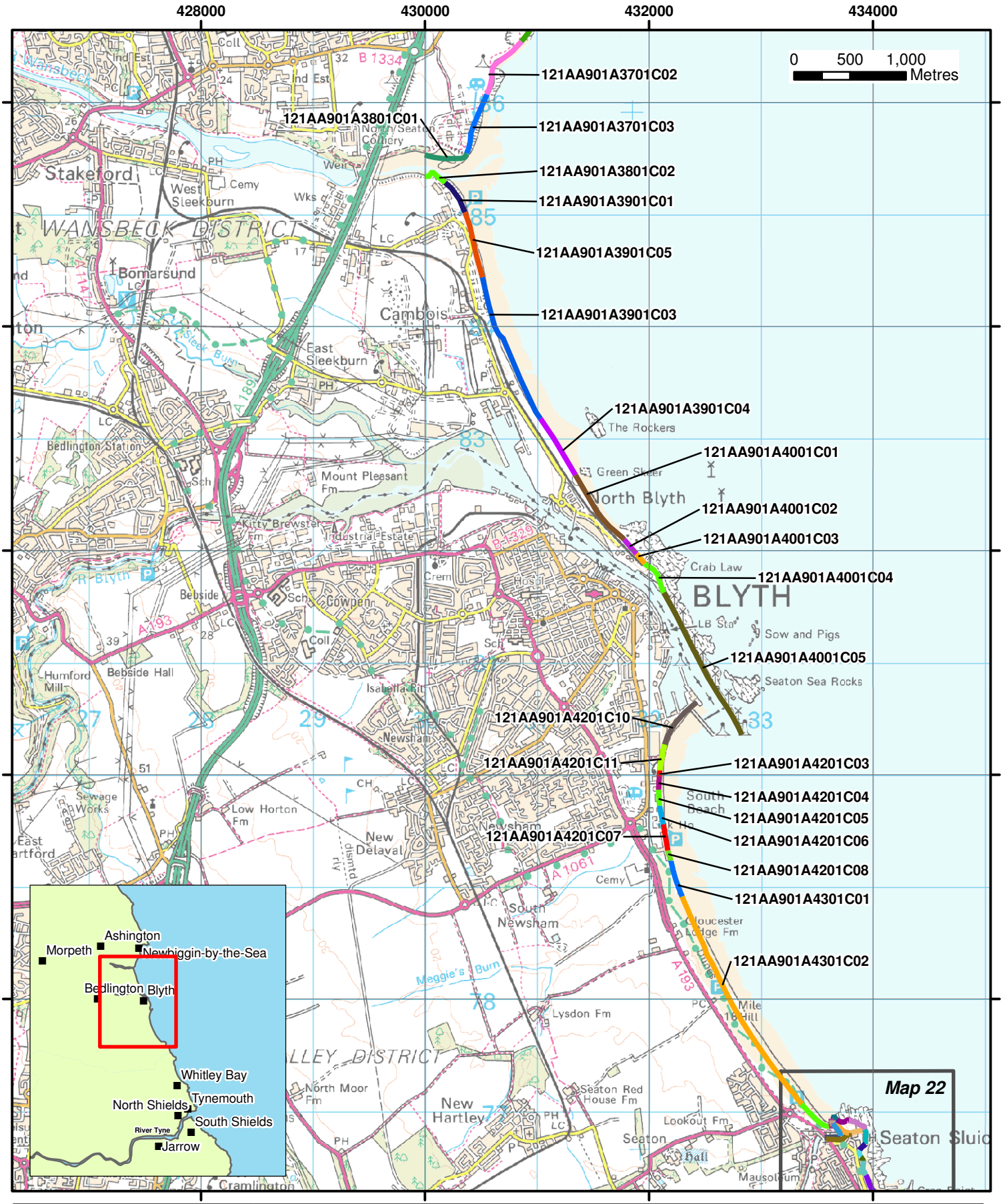

Legend

Asset location

NFCDD Asset Number

Client: North East Coastal Group
Project: Cell 1 Regional Coastal Monitoring Programme

Figure 1 - Map 21 Northumberland County Council Frontage

Asset Inspection Report 2010

Drawing Scale 1:45,000 at A4

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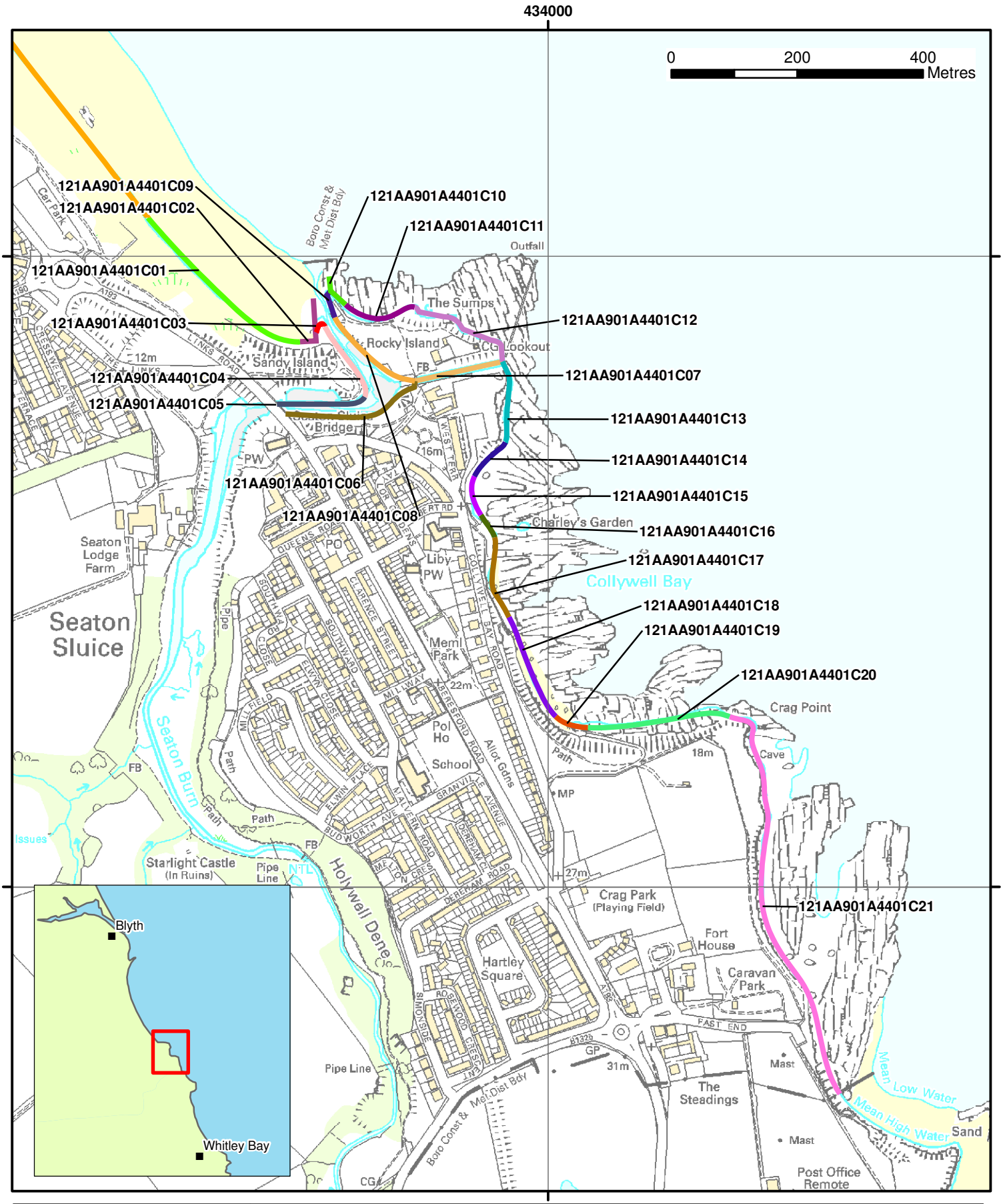

Legend

Asset location

NFCDD Asset Number

Client: North East Coastal Group
Project: Cell 1 Regional Coastal Monitoring Programme

Figure 1 - Map 22 Northumberland County Council Frontage

Asset Inspection Report 2010

Drawing Scale 1:8,000 at A4

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