



## Walk-over Visual Inspections of Assets



**Hartlepool Borough Council  
Final Report**

**July 2014**

# Hartlepool Borough Council

## Walk-over Visual Inspections of Assets

### Contents Amendment Record

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# Preamble

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

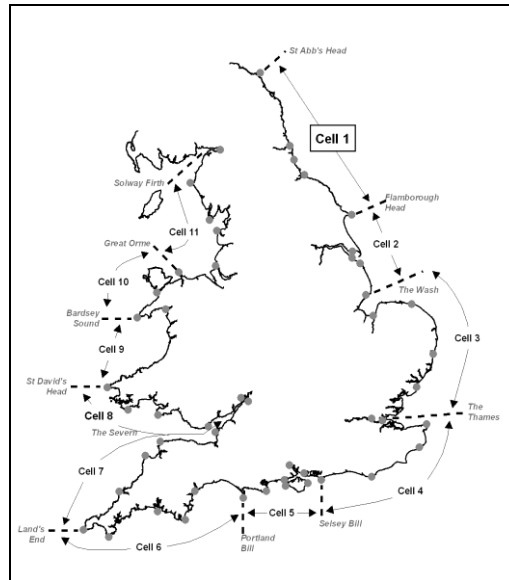


Figure 0-1: Sediment Cells in England and Wales

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



The original three year programme of work was undertaken as a partnership between Royal Haskoning, Halcrow and Academy Geomatics. For the current five year programme of work the data collection associated with beach profiles, topographic surveys and cliff top surveys is being undertaken by Academy Geomatics. The analysis and reporting for the programme is being undertaken by Halcrow Group Limited (Halcrow) a CH2M HILL company.



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

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.

The present report provides a summary of the main findings of the Coastal Walk-over visual Inspections of assets of Hartlepool Borough Council's frontage that were carried out in July 2014.

## 1. Introduction

### 1.1 Study Area

Hartlepool Borough Council's frontage is approximately 12.5km in length and extends from Crimdon Beck in the north to the North Gare Breakwater at the entrance to the Tees estuary in the south as shown in Figure 1-1. In accordance with previous coastal inspection surveys, this frontage is subdivided into approximately coastal 40 assets, 37 of which are man-made assets while 3 are natural assets. Detailed maps showing the location of each of these NFCDD assets are presented in **Appendix A**.

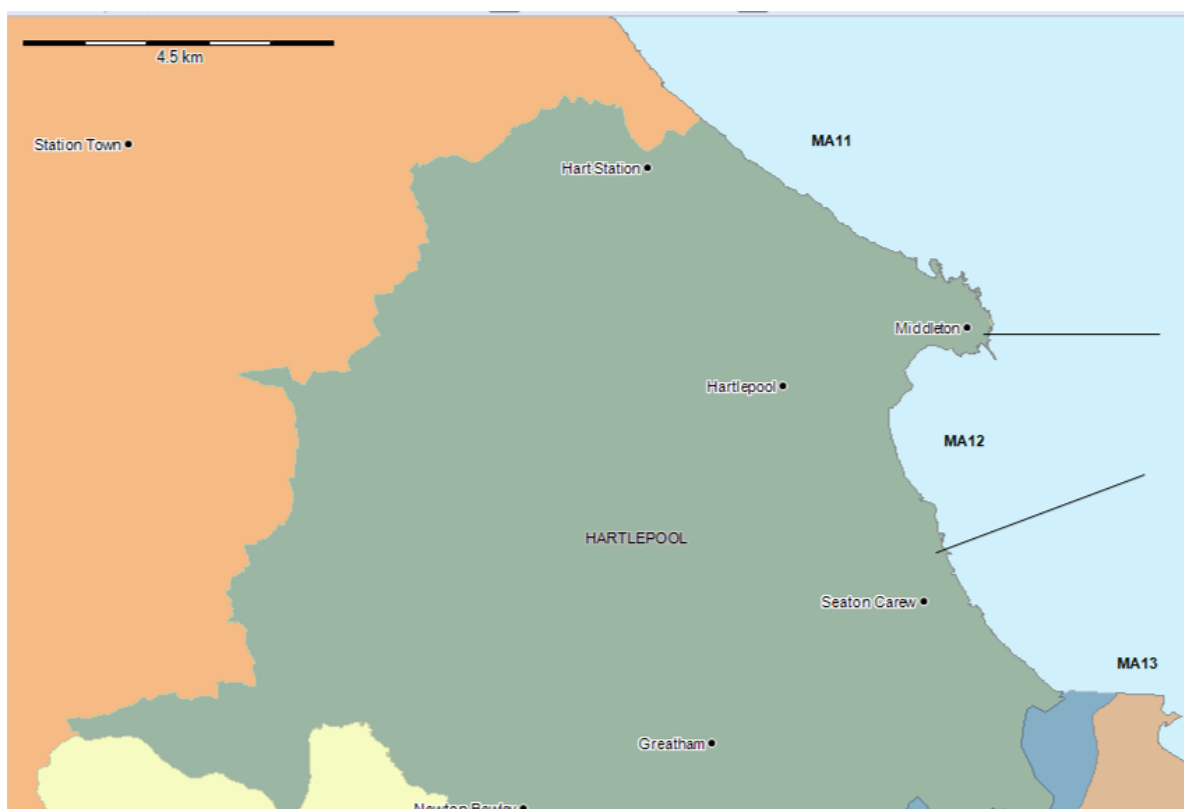


Figure 1-1: Hartlepool Borough Council study area.

## 1.2 Methodology

This section presents the approach taken by the slope and asset inspectors respectively for the Hartlepool Borough Council coastal frontage.

The visual assessment of both natural and built assets on the Cell 1 coastline was carried out by a team of Chartered engineers in Summer / Autumn 2014. The walkover inspection for the Hartlepool Borough Council frontage was undertaken on the 4<sup>th</sup> July 2014 by a coastal engineer familiar with the frontage having also undertaken the previous inspection in 2012. The weather experienced during this time was dry with offshore winds. As with the previous inspections undertaken in 2010 and 2012, the quay walls within Victoria Harbour and Hartlepool Marina were not inspected because they are not classified as coastal defence assets and they are located within privately owned areas.

The frontage has been split into a number of 'asset lengths' as defined in the National Flood and Coastal Defence Database (NFCDD) that was established by the Environment Agency (EA). These asset lengths have been used for reporting on the walkover inspections since 2008.

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

For built assets the grading classification was undertaken in accordance with the Condition Assessment Manual (EA, 2011), with estimates made of the urgency of any necessary repairs. An extract of the grading classification for built assets is presented in Table 0-1. For ease of reference the photos presented in this report have also been bordered with the colours indicated in the key below.

Grade	Rating	Description
1	Very Good	Cosmetic defects that will have no effect on performance.
2	Good	Minor defects that will not reduce the overall performance of the asset.
3	Fair	Defects that could reduce performance of the asset.
4	Poor	Defects that would significantly reduce performance of the asset. Further investigation needed.
5	Very Poor	Severe defects resulting in complete performance failure.

*Table 0-1: Condition assessment grading for man-made assets.*

In addition to the above grading classification, for natural asset such as cliffs and slopes the same five point activity scale used in previous cliff activity assessments undertaken by Halcrow for Scarborough Borough Council in Cell 1 was used (Halcrow 2002, Halcrow 2005, Halcrow 2009). An extract of this grading classification is presented in Table 0-2. For ease of reference the photos presented in this report have also been bordered with the colours indicated in the key below.



Rank	Activity Class	Description
1	Dormant	Protected cliffline or landslide complex with no visible evidence of landslide activity.
2	Inactive	Relict cliffs or landslides with vegetated slopes and localised erosion of the toe or failure of the headscarp.
3	Locally	Retreating cliffline with localised small landslides or areas of erosion.
4	Partly	Retreating cliffline with very common smaller-scale landslides or areas of intense erosion.
5	Totally	Retreating cliff line almost entirely affected by large-scale landsliding or intense erosion.

*Table 0-2: Condition assessment grading used for natural assets (cliffs/ slopes).*

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

For ease of reference the report has been sub-divided into "Management Areas" as defined in the overarching Shoreline Management Plan (SMP2) for the coastline between The River Tyne and Flamborough Head.

In addition to this report, full details of the inspection and a selection of appropriate photographs have been entered into the SANDS database, a copy of which, along with viewing software is provided along with this report.

## 2. Overview

There have been limited changes in the condition of most of the built and natural defence assets along the Hartlepool frontage since the previous formal inspections in 2012. An overview summary of the main differences is given below.

- **North Sands** – redistribution of bricks continues following removal of the failing gabion baskets fronting the former industrial unit south of the cemetery. The informal slag and rubble revetment between the north end of defences at Marine Drive and the former Britmag works site have now broken up completely, leaving eroding cliffs in the slag bank.
- **Marine Drive & Hartlepool Headland** – Works have been undertaken to deal with some of the toe erosion issues, but there is further spalling and abrasion to the seawalls with damage to the toe and front face, particularly in the most exposed area just north of the Heugh Breakwater.
- **Fish Sands / Old Pier** – A building has been demolished from the Old Pier, part of the concrete deck surfacing renewed and new hand rails placed around the north side. The cracking between deck and crest wall around seaward end has worsened.
- **Town Wall** – The concrete toe protection apron and groyne repairs constructed in 2012 appear to be holding well. However, the crest wall, which is part of the Scheduled Monument, has voids and missing mortar particularly on the landward side and requires further (and regular) repairs.
- **West Harbour** – voids and undercutting of the toe apron on the Middleton Beach side of North Pier require attention. Undercutting of the concrete access steps and walls either side of the slipway north of Tees and Hartlepool Yacht Club had worsened since 2012. Minor settlement in the concrete block revetment as in 2010/12.
- **Seaton Carew** – sections of the main seawall, including beach access steps, adjacent wall and promenade have been significantly improved. The low wall at the car park and sewage pumping station has been replaced with a new wall constructed to seawards of the old wall and extending northwards to tie into the main seawall.
- **North Gare** – further patch repairs were evident although the structure remains in a poor state and continues to deteriorate.





### 3. Condition Assessment

#### 3.1 Blackhall Rocks to Heugh Breakwater (MA 11)

##### **North Sands**

The Hartlepool Borough Council frontage starts mid-way through the SMP2 Management Area 11 at Crimdon beck, with the first NFCDD asset length commencing at the dunes at the Hart Warren Nature Reserve. The undefended NFCDD Asset Ref. No. 1221C901C0302C01 is continuous from the local authority border in the north to the eastern end of the eroding cliff / slag bank at Spion Kop cemetery.

As noted in the 2010 and 2012 inspections, the dunes to the south of Crimdon Dene fronting Hartlepool Golf Course were high and steep with sparse vegetation coverage (below left and right) where Crimdon Beck flows along the dune toe. Away from the beck the sand dunes appeared to maintain a consistent height along the frontage with vegetation coverage generally increasing to the south (below right). A wide sandy beach was present along North Sands.

 <p>October 2012</p> <p>Photograph from 2012. (Asset ref. No. 1221C901C0301C01)</p>	 <p>July 2014</p> <p>Crimdon beck in mid photo. Eroding dune face where beck is close to toe very similar to 2012. (Asset ref. No. 1221C901C0301C01)</p>
 <p>Looking towards Crimdon from near Winterbottom Avenue underpass, showing wide beach (Asset ref. No. 1221C901C0302C01)</p>	 <p>Embryo dunes fronting the former Britmag site. (Asset ref. No. 1221C901C0302C01)</p>

At North Sands the demolition work and site remediation that was underway at the former Steetley Magnesite Britmag works in 2012 is complete. The beach is wide here and although the dunes are low they still appear to be accreting with embryo dune vegetation building to seaward, above right.



Wide beach at North Sands adjacent to former Britmag site.  
(Asset ref. No. 1221C901C0302C01)

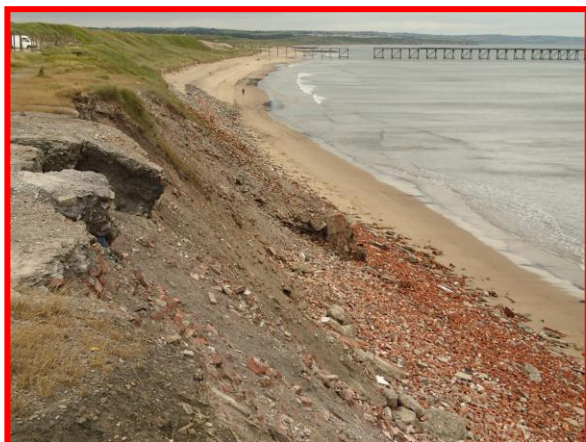


Looking north from Cemetery towards Britmag jetty showing low dunes forming in front of slag embankment  
(Asset ref. No. 1221C901C0302C01)

The frontage at the former Britmag works consists of a slag and rubble embankment fronted by sand dunes (above right). Moving south the embankment becomes higher and further seaward. East of Spion Kop cemetery the slag embankment is actively eroding in front of the former industrial site, see below.

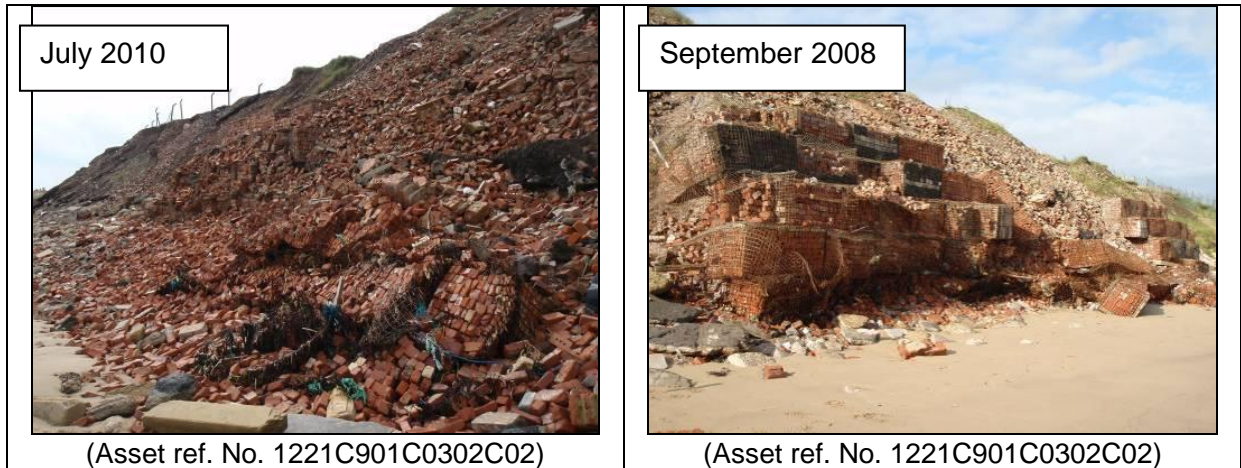


Eroding embankment east of cemetery in mid-distance.  
(Asset ref. No. 1221C901C0302C01)



Eroding embankment / cliff previously protected by brick filled gabions.  
(Asset ref. No. 1221C901C0302C02)

The slag embankment previously had a short, around 100m near vertical section (Asset ref. No. 1221C901C0302C02) protecting the cliff adjacent to a former large industrial building, that was protected by brick filled wire gabions, see photos from 2008 and 2010 below. Many of the failing gabion baskets were removed on health and safety grounds prior to the 2010 inspections and the asset now consists of an eroding brick / waste rubble slope (above right) rather than the vertical structure observed in 2008.



The slag and rubble embankment to the north of Marine Drive (Asset ref. No. 1221C901C0302C03) has continued to deteriorate. The former protective chemical slag apron has now largely broken up, and the underlying cobble / rubble slope appeared lower again and beach levels were lower than during the 2012 inspection. The short section of rock armour at the interface between the slag bank and Marine Drive seawall remains in fair condition; in 2012 it was partly covered with sand, although this may have been at least partly related to works underway on the adjacent seawall at the time.

### ***Marine Drive and Hartlepool Headland***

The seawall fronting Marine Drive (Asset Ref. No. 1221C901C0303C01) had a major repair in 2012 at the north end, see 2012 inspection report. The wall shows evidence of a significant number of repairs which generally appeared to be performing well. However, to the east of the access ramp near Arabella Street the beach levels were low, exposing the toe to undercutting, see below lower right. Previous toe repairs are evident, but need extending. There are also some areas of cracking and spalling locally requiring repair, and damage to the coping at the access steps which are heavily abraded. The wall has been classed as good overall in previous assessments, but due to the low beach levels and scour has been downgraded to fair in this assessment.



Rock armour at intersection of Marine Drive and slag bank (Asset ref. Nos. 1221C901C0303C01 / 302C03)



Seawall at return end (Asset ref. No. 1221C901C0303C01)



View of blockwork wall with damaged cope and cracking (Asset ref. No. 1221C901C0303C01)



Local repairs to toe have been undertaken but further work is needed to toe and damaged coping. (Asset ref. No. 1221C901C0303C01)

Further south east, the seawall fronting Sea View Terrace and the Town Moor (Asset ref. No. 1221C901C0303C02) is constructed from larger concrete blocks, see below upper left. Spalling of the concrete coping units was extensive although some repairs were evident. Cracking or displacement of the coping was noted adjacent to a repair at the most exposed and heavily overtopped section, see below centre left. Abrasion of the blockwork appears to worsen to the south where it is exposed to larger waves.



Abraded blockwork wall near Broad Field rd. (Asset ref. No. 1221C901C0303C02)



Previous repairs to toe near Sea View Terrace (Asset ref. No. 1221C901C0303C02)



View of promenade and repairs to coping, showing crack adjacent to coping (Asset ref. No. 1221C901C0303C02)



Scour and abrasion at wall toe (Asset ref. No. 1221C901C0303C02)



Damage to concrete toe (Asset ref. No. 1221C901C0303C02)



Damage to concrete toe similar to 2012 inspection (Asset ref. No. 1221C901C0303C02)

The concrete toe was visible along the length of seawall. Beach levels were lower than in 2012, when there had been a sand beach present at the northern end, near Sea View Terrace. The toe consists of a variety of constructions from older stepped concrete profiles to more recent massive precast concrete blocks and insitu fill and was mostly in fair to good condition. In some locations the most recently placed sections were in very good condition. However, in several other locations where new concrete units were not present at the toe, the older sections of toe had been undercut locally as the soft rock on which the wall is founded gets abraded and worn down (above left and right) and toe units had been displaced, requiring repair.

The short length of wall at the apex of the headland (Asset ref No. 1221C901C0303C03) near the Coastguard building, below left, has a slightly stepped profile to the concrete blocks. Previous repairs to the capping beam are showing further damage. There have been extensive previous repairs and as the area around here is the most exposed section of defence there is a need for regular ongoing maintenance.



Stepped wall at apex of Headland.(Asset ref. No. 1221C901C0303C03)



Damage and missing blocks at south of headland (Asset ref. Nos. 1221C901C0303C04 & 1221C901C0303C04)

The wall with smaller blockwork and rendered sections (Asset ref No. 1221C901C0303C04) immediately south of the apex of the headland was in poor condition; see above right and below left. There are some missing blocks, extensive abrasion damage, pitting of block surfaces, parts of the wall are bulging and there is extensive cracking and loss of blocks in the buttress sections. There are numerous previous patch repairs and further attention is required.

The dressed masonry wall (Asset ref. No. 1221C901C0401C02) between the ramp and the Heugh Breakwater (below right) was in a similar condition to the 2012 inspection, with some missing pointing, evidence of previous repairs and extensive abrasion damage to the lower courses of blocks. The marine growth indicates that the abrasion is not recent.



Surface abrasion damage to wall adjacent to ramp showing multiple previous repairs and voids. (Asset ref. No. 1221C901C0303C04)



Dressed masonry wall adjacent to Heugh breakwater, showing abrasion to lower wall (Asset ref. No. 1221C901C0401C02)

Only the landward section of the Heugh Breakwater, which is privately owned, is accessible to the public and so the seaward half was not inspected. The landward section appeared to be in fair condition with no obvious gaps in the blockwork. It is understood that the seaward end has been in a failing condition for many years. There is fencing and signs to prevent access to the seaward section, see below lower left.





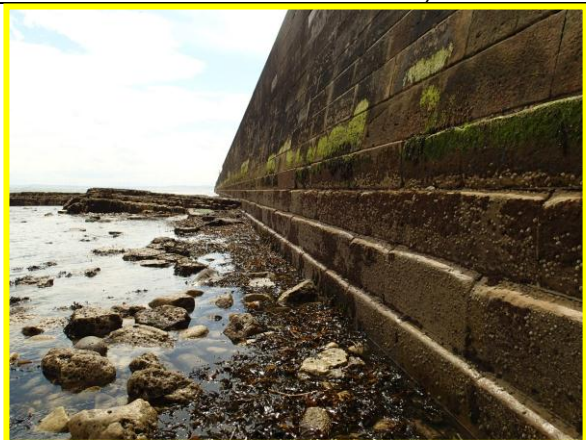
Heugh breakwater promenade, with repairs to gaps between slabs (Asset ref. No. 1221C901C0401C01)



South side of landward end of Heugh breakwater (Asset ref. No. 1221C901C0401C01)



Fencing and warning signs at mid length of breakwater. (Asset ref. No. 1221C901C0401C01)



North side of breakwater (Asset ref. No. 1221C901C0401C01)

### 3.2 Heugh Breakwater to Little Scar (MA 12)

#### ***Bock Sands***

Bock Sands is located in the lee of the Heugh Breakwater and has a low wall in front of the reclaimed area containing Block Sands paddling pool and a larger set back retaining wall supporting the road and properties to the rear. As in 2012, the low beach levels were exposing the toe of the low front wall, particularly to the south and there were areas of undermining that require attention to prevent loss of infill and void formation, see below upper right.



Damage to coping on Block Sands seawall  
(Asset ref. No. 1221C901C0401C04)



Low beach levels exposing toe at Block Sands wall.  
(Asset ref. No. 1221C901C0401C04)

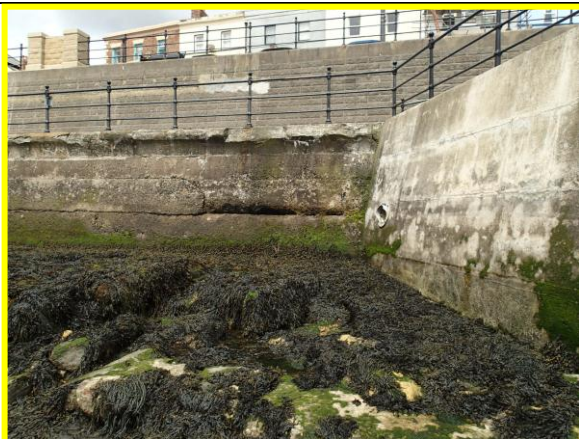


Rear retaining wall at Block Sands.  
(Asset ref. No. 1221C901C0401C04)



Rear retaining wall at Block Sands with missing mortar in joints and damage to blocks (Asset ref. No. 1221C901C0401C04)

As in 2012, damage was evident to the curved coping of the adjoining concrete seawall (below right) (Asset ref. No. 1221C901C0401C05) that links between Block Sands wall and the Old Pier. The damage was worst at both ends, where foreshore levels are lowest although there have been repairs near the Old Pier.



Damage to wall adjacent to west end of Block Sands seawall.  
(Asset ref. No. 1221C901C0401C05)

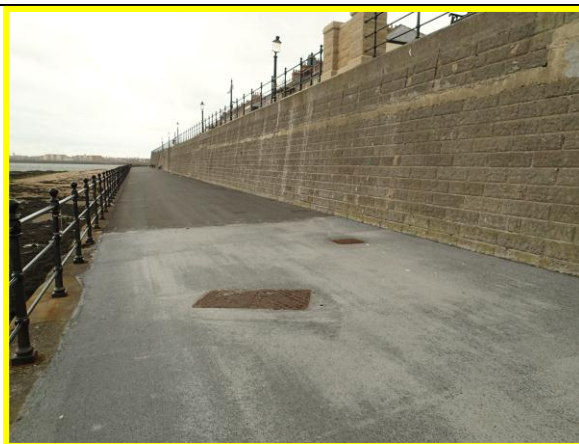


Damaged coping at exposed eastern section  
(Asset ref. No. 1221C901C0401C05)

The retaining wall fronting South Crescent/Albion Terrace/York Place appeared to be in fair condition (below upper left and right). In the centre section of the front wall there is a high cobble beach that covers the crest, see below left and right lower.



New steps at west end of rear retaining wall, (Asset ref. No. 1221C901C0401C05)



Promenade and rear retaining wall, (Asset ref. No. 1221C901C0401C05)



High cobble beach at mid-length of wall (Asset ref. No. 1221C901C0401C05)



Erosion at edge of cobble beach (Asset ref. No. 1221C901C0401C05)

### **Old Pier**

Old Pier, (Asset ref. No. 1221C901C0401C34 and C06) is a masonry and concrete breakwater with Accropode armour protection at the south western extent which provides shelter to Fish Sands and the Town Wall. The larger building that was on the pier has been demolished and the pier concrete surface replaced where it was removed. New handrails have also been placed along the previously unprotected north side. The structure appeared in generally fair condition with minor settlement of blockwork observed on the inward face (below lower left). Armour units appeared in good condition with appropriate voids and interlock. There was cracking in the deck adjacent to wall and through the concrete parapet wall in a number of places, see below right. This was seen in 2010 and although repairs have been undertaken the cracking has opened again in some locations, notably at the seaward end where the crest wall is leaning seawards, below right. As previously noted in 2012 the cracking may indicate settlement of the overall wall rather than simply damage to the parapet.



Cracking alongside crest wall  
(Asset ref. No. 1221C901C0401C34)



Cracks through deck and crest wall.  
(Asset ref. No. 1221C901C0401C34)

Settlement was also apparent in the inner face of the Old Pier, see below left and right, although this appeared to be historical movement.



Landward side of Old Pier showing settlement in the (original?) masonry blockwork.  
(Asset ref. No. 1221C901C0401C06)



Landwards side of pier showing new handrails.  
(Asset ref. No. 1221C901C0401C06)

### **Town Wall and Fish Sands**

In the lee of Old Pier at the south-eastern end of Town Wall, the beach level at Fish Sands was healthy as reported in 2010 and 2012, and the masonry wall appeared in fair to good condition (below left). The overall asset condition is rated as fair, although certain elements are good others such as the landward side of the crest wall are poor.



Masonry wall at south east end of Town Wall.  
(Asset ref. No. 1221C901C0401C35)



View of Town Wall from east end, showing new toe protection apron (Asset ref. No. 1221C901C0401C35)

The toe protection apron constructed in 2012 appeared to be performing well. However, although three of the groyne had been repaired the beach remains low. The channel seawards of the beach toe is probably dredged for access to the harbour and so there is no supply of sand to this beach and any storm draw-down will be lost into the channel. It is suggested that coarse sand recharge could be considered, and it may be beneficial to extend the groyne back to the seawall to help retain a recharged beach.



View east along main part of Town Wall. The section in midfield has historically been rebuilt with concrete blocks anchored with steel tie bars which are corroding.  
(Asset ref. No. 1221C901C0401C35)



Large groyne structure near mid point of Town Wall marks large change in beach levels, cobble slag beach on west side in foreground.  
(Asset ref. No. 1221C901C0401C35)

The paving stones and highway retained to the full length of the rear of the seawall appeared to be in very good condition. Beach levels increase from the gateway in the wall to the large masonry groyne at the slight headland near the mid point of the wall, above right. There is a large (2 to 3m) change in level of the (mainly cobble) beach either side of this groyne, with low beach levels extending fairly consistently to the west, with the beach consisting of slag based

gravel, see below left. The wall here appeared to be in fair condition as reported in previous inspections. At the western end of the frontage the redundant steps at the old ferry terminus remain in poor to fair condition with significant corrosion to the steps and spalling to the wing walls with missing masonry. However, the condition of this part of the structure is not a significant concern since the area is barriered off to the public.



Western section of Town Wall showing low beach levels,  
(Asset ref. No. 1221C901C0401C35)



Steps at former passenger ferry landing at west end of town Wall,  
(Asset ref. No. 1221C901C0401C35)

The Town Wall requires regular maintenance as it is a Scheduled Monument and the materials that can be used in repair are not very durable. It is assumed that the pointing would have been repaired when the major works to stabilise the wall were undertaken in 2012. However, the inner face of the crest wall is now in a poor condition and requires urgent repairs to replace missing stones and mortar in various isolated locations, see photos below left and right.



Eastern part of parapet wall to Town Wall showing missing stones and mortar,  
(Asset ref. No. 1221C901C0401C35)



Central part of parapet wall to Town Wall showing missing mortar  
(Asset ref. No. 1221C901C0401C35)

### **Middleton**

The concrete Accropode armoured breakwater of Middleton Jetty again appeared to be in good overall condition, providing protection to the entrance to Victoria Harbour basin and stabilising Middleton beach, see below left and right. The armouring appeared to have good interlock and coverage. The toe at the roundhead and basin entrance side could not be inspected as they are was submerged at low tide.



Middleton Jetty in good condition. Retains sand and rubble beach to south  
(Asset ref. No. 1221C901C0401C16)



View of Accropode armoured breakwater (Middleton Jetty) from Town Wall.  
(Asset ref. No. 1221C901C0401C16)

Adjacent to Middleton Jetty to the south is a gabion basket wall with a stepped profile, (Asset Ref. No. 1221C901C0401C17). The Gabion baskets (below left and right) are fronted by low sand dunes in the north and rock armour in the south. Rock armour units increased in size towards the south and appear to be performing well. The gabion baskets were reported to have settled locally in 2010 inspections and the situation appeared very similar in 2012, see photos below. The baskets were still largely intact although should be monitored as the wall could unravel rapidly should baskets fail. Consideration should be given to adding more rock armour, and reprofiling the rock in front of the failing gabions.



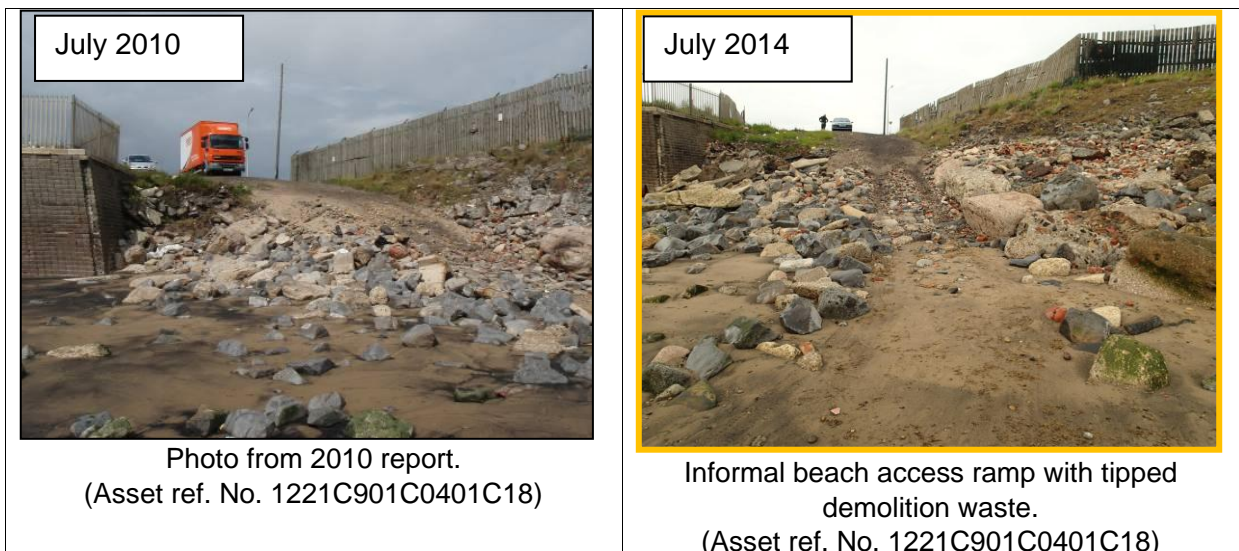
View of Gabion baskets with rock armour.  
Photo from 2010 report.  
(Asset ref. No. 1221C901C0401C17)



View of Gabion baskets with rock armour.  
Photo from 2012 report.  
(Asset ref. No. 1221C901C0401C17)



South west of the rock armour, there is an informal access ramp to the beach, which is recorded as 'undefended' in NFCDD. Demolition waste rubble appeared to have been tipped informally, possibly to help resist erosion or to prevent / reduce public vehicle access onto the beach. The slope to the southern side of the access appeared to be less stable than that to the north, indicating potential for outflanking of the defences to the south if left unmanaged.



The near vertical wall to the south west (Asset ref. No. 1221C901C0401C19) has two forms of construction, with the north eastern 2/3 a near vertical apparently loose stacked block / brick wall, whilst the south western 1/3 is an older vertical concrete block wall, see photos below. The eastern wall fronting the industrial property was in fair condition with the defects noted in the 2010 and 2012 inspections having worsened locally. There is local widening of construction joints, minor bulging and missing blocks from both front face and particularly the coping. These defects should be repaired to prevent them spreading through the structure. The missing blocks at the west end are exposing what appears to be lean mix backfill.





Older concrete block wall in foreground; newer slightly sloping smaller block wall in distance.  
(Asset ref. No. 1221C901C0401C19)



Missing blocks at interface between two sections of wall. Photo from previous report.  
(Asset ref. No. 1221C901C0401C19)



Missing blocks at interface between two sections of wall.  
(Asset ref. No. 1221C901C0401C19)



Cracks and opening joints due to movement  
(Asset ref. No. 1221C901C0401C19)

The concrete block wall to the south, which is split between assets C19 and C20 at the corner has extensive abrasion damage to the faces of the blockwork (below left), particularly at lower levels, see below left and right. Cracking of the concrete coping was also observed and there are previous repairs to damage to the facing of the south facing section of wall that appears to be holding well.



Older concrete block wall has damaged blocks with missing facing.  
(Asset ref. No. 1221C901C0401C19)



Toe scour and abrasion damage at corner of wall (Asset ref. No. 1221C901C0401C20)

### ***West Harbour***

West Harbour provides access to Hartlepool Marina via a lock and is sheltered by North Pier and South Pier. Public access to the North Pier and its inner arm is prevented by a security gate and fencing at the landward end, however as noted in the 2010 report, access to the structures would still be possible at low tide via the masonry apron presenting potential health and safety issues.

The outside face of North Pier appeared in generally fair condition from the landward, Middleton Beach end. However, as in 2012 the low beach levels had exposed the timber piles at the edge of the toe apron and the apron has areas of damage and voiding, see below right. There was evidence of patch previous defects in the apron, but there was a void under the face of the wall at the edge of the apron, below lower left. This and other similar defects should be repaired before the structure becomes destabilised.



Steps giving access to Middleton beach from root of North Pier (Asset ref. No. 1221C901C0401C22)



Void in toe apron on north side of North Pier (Asset ref. No. 1221C901C0401C22)



Damaged toe apron exposing void under wall on Middleton Beach side of North Pier (Asset ref. No. 1221C901C0401C22)



Middleton Beach side of North Pier near low water (Asset ref. No. 1221C901C0401C22)

The inside face and seaward end of the two sections of North Pier were only inspected from land and from South Pier. The structure appeared in fair or poor overall condition, but with significant areas of masonry damage, extensive patchwork repairs and several large concrete repairs.

The rock armour revetment overlaying the former stone stepped revetment at the north end of West Harbour (Asset ref. No. 1221C901C0401C23) appeared to be in fair condition, below left as in previous inspections. The wide promenade crest slab behind the revetment has some surface damage that has expanded since 2012 and needs a minor repair. The mass quay wall structure at the rear of the harbour, to the north side of the lock (Asset ref. No. 1221C901C0401C24) has a newer masonry flood wall on the crest that was built when the area was redeveloped. The flood wall appeared to be in good condition, although as noted in previous reports it ties in to the lock structure at a slightly lower level, see below right; presumably this was to allow for wave action on the main wall, which would be less at the lock as it is more sheltered. There was extensive seaweed coverage to the lower wall that prevented inspection although there was no obvious global movement or distress apparent in the structure to suggest any major problem.



Revetment at north end of West harbour. (Asset ref. No. 1221C901C0401C23)



Flood wall tie into lock structure, photo from 2012 report. (Asset ref. No. 1221C901C0401C22)

The concrete structures forming the lock entrance were in good condition, although water level prevented the inspection of the lower section of these walls. The toe apron of the short section of wall to the south of the lock, (Asset ref. No. 1221C901C0401C25) was again covered in seaweed so not able to be inspected, but there were no obvious problems and the wall itself is in good condition.



Wall to south side of lock entrance.  
(Asset ref. No. 1221C901C0401C25)



Wall to south side of lock entrance, toe apron covered in seaweed.  
(Asset ref. No. 1221C901C0401C25)

The concrete block set revetment (Asset ref. No. 1221C901C0401C25) fronting Slake Terrace was in good condition, apart from an area of settlement with a diameter of about 2m, see below left. This defect has been noted on the inspections since 2008 and does not appear to have changed significantly. As noted previously, the settlement is indicative of a local loss of fill material below the concrete blocks and should continue to be monitored as further loss could reduce the integrity of the asset.



Area of settlement in block revetment  
(Asset ref. No. 1221C901C0401C25)



Undercutting of steps and wall near sailing club  
(Asset ref. No. 1221C901C0401C27)

The undercutting at the steps, slipway and walls to the vertical wall north of the Yacht Club first noted to have problems in the 2010 inspections, was similar or slightly worse in October 2012 and appeared more extensive in the July 2014 inspection, see photo above right and below left and right, with undercutting at the slipway, the steps and also at the wall between the steps and the slipway. As previously recommended the voids under the apron should be repaired and additional protective rock armour placed to reduce wave reflections and help avoid further scour damage.



Undermining of toe of wall looking west from slipway (Asset ref. No. 1221C901C0401C27)

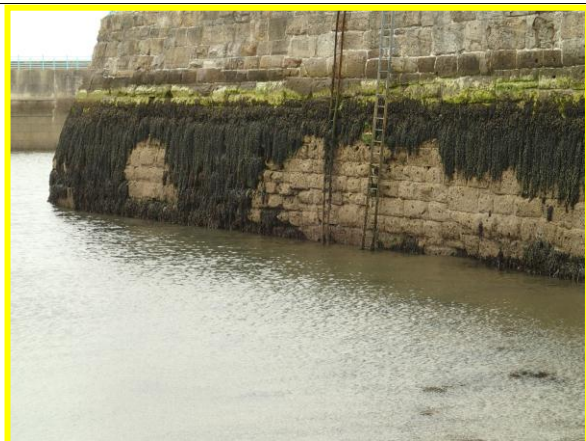


Undercutting of slipway (Asset ref. No. 1221C901C0401C27)

Middle Pier appeared to be in fair condition, although there was significant growth of vegetation in gaps in the masonry slabs in the deck, which should be removed and the gaps repointed, see below left. The condition was very similar to that seen in 2012. The lower parts of the structure were heavily obscured by seaweed, but where visible appeared in fair condition with some loss of mortar to joints.



Vegetation growing in between masonry slabs and patch repairs in deck of Middle Pier (Asset ref. No. 1221C901C0401C28)



Inner face of Middle Pier, showing mortar loss where gaps in seaweed (Asset ref. No. 1221C901C0401C28)



Outer face of Middle Pier, showing rock toe armour. (Asset ref. No. 1221C901C0401C28)



Flood wall and rock toe armour at harbour rear wall (Asset ref. No. 1221C901C0401C29)

The old masonry wall with newer concrete parapet flood wall along the rear of the southern part of the harbour (asset ref. 1221C901C0401C29), above right was in fair condition. There was again heavy coverage with seaweed obscuring the defence, but some open joints requiring repointing were visible in places.

South Pier (Asset ref. No. 1221C901C0401C32) was in good condition with the rock armour (inner face) and Accropodes (roundhead and outer face) maintaining a consistent profile with good interlock between units where visible. However, due to the nature of the structure inspection of the seaward end and lower part of the outer face was not possible from the crest on foot and a boat survey at low tide should be considered at some point in future, although there were no signs of apparent distress so this is not urgent.



South Pier rock armour on inner face, with vegetation that should be removed. (Asset ref. No. 1221C901C0401C32)



South Pier Accropode armour on outer face (Asset ref. No. 1221C901C0401C32)

### **Carr House Sands**

To the south of South Pier the Accropode armour ties into a rock armour revetment with concrete crest wall (Asset ref. No. 1221C901C0401C33) that runs for almost 2.3km to Little Scar at the north of Seaton Carew. The defences along this section remain in good overall condition with a few minor defects and local repairs that will require attention. There were signs of minor repairs to some crest wall construction joints, and although the rock armour appeared to give good coverage there were pieces of rock armour seaward of the toe in several locations to the south of Newburn Bridge, indicating some local displacement of the rock armour, which should be monitored and reprofiling considered at some time in future.

The beach levels near the access steps at the south of this frontage were significantly higher than during the inspection in 2012, apparently indicating success of the reconfiguration of the rock armour berm at the access steps at Little Scar, see below lower photos.

	
<p>Rock armour defence in good condition to south of South Pier (Asset ref. No. 1221C901C0401C33)</p>	<p>Promenade with crest wall to left and low flood wall to rear at the south of South Pier (Asset ref. No. 1221C901C0401C33)</p>
	
<p>Construction joint in crest wall south of Newburn Bridge (Asset ref. No. 1221C901C0401C33)</p>	<p>Possible displacement of rock armour south of Newburn bridge (Asset ref. No. 1221C901C0401C33)</p>



Rock armour in good condition near north end of Seaton Carew  
(Asset ref. No. 1221C901C0401C33)



High beach levels almost covering rock bund at access ramp near Little Scar  
(Asset ref. No. 1221C901C0401C33)

### 3.3 Little Scar to Coatham Sands (MA 13)

#### ***Seaton Carew***

The beach levels along the Seaton Carew frontage have varied significantly since the first inspections under the programme in 2008. In 2010 the beach levels were significantly higher than for the 2008 inspections, especially towards the south of the frontage (below, left & right). This led to sand obscuring some of the defects previously identified in the lower sections of structures. For the 2012 inspections beach levels at the toe of the defences appeared similar to or maybe lower than during the 2008 inspections.

The defences to the south of Seaton Carew had renewed, on a slightly more seaward alignment prior to the 2014 inspections so a direct comparison is not readily possible from the photographs below, although the beach appeared to be higher than in 2012.



October 2008



August 2010





The structures along the Seaton Carew frontage consist of various concrete and masonry structures with toe rock armour units locally. The inspection took place on 04 July 2014, and is reported, working from north to south below.

At Little Scar at the northern limit of Seaton Carew the concrete seawall is protected by rock armour. There is a rock beach control structure protecting the beach access ramp and rock armouring to the seawall toe, see above final photo for Asset ref. No. 1221C901C0401C33. As noted above the beach levels were significantly higher during the 2014 inspections.

The beach access steps and adjacent sections of seawall that were noted to have significant defects in the 2008 and 2010 inspections had, prior to the 2012 inspections, been reconstructed, with repairs to adjacent sections of wall and improvements to the promenade. These repairs appear to be holding well. The cobble beach seen at the access steps in 2012 was covered by the high sand beach in 2014, see below centre left and right.

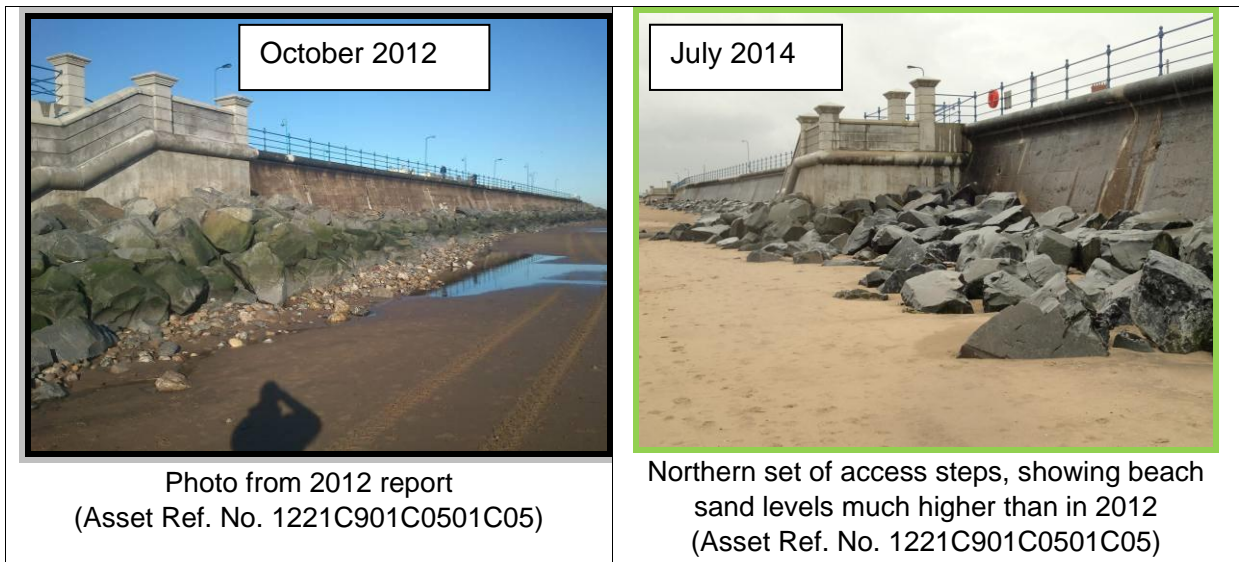


Photo from 2012 report  
(Asset Ref. No. 1221C901C0501C05)

Northern set of access steps, showing beach  
sand levels much higher than in 2012  
(Asset Ref. No. 1221C901C0501C05)



High cobble beach level adjacent to rebuilt northern steps in 2012.  
(Asset Ref. No. 1221C901C0501C05)



High sand levels at northern steps. Note missing coping stones on wall adjacent to steps  
(Asset Ref. No. 1221C901C0501C05)



General view of promenade in good condition  
(Asset Ref. No. 1221C901C0501C05)



Recently constructed new beach access ramp and seawall at south end of main seawall.  
(Asset Ref. No. 1221C901C0501C05)

To the south of the beach access point the seawall has been reconstructed on a slightly more seaward alignment, giving improved protection all the way through to the south of the pumping station where the dunes start, some 600m to the south. These works were getting underway at the time of the 2012 inspections. Note that the three previous defence asset references covering this section, 1221C901C0501C04, 1221C901C0501C03 and 1221C901C0501C02 have been reconfigured in the SANDS database to align with the new structures. As noted in previous years this length of defence is fronted by a wide protective beach. The recently constructed new seawall with access ramps were in as new condition, see photographs below. It was noted that the promenade surfacing consists of small paving slabs, which may be prone to damage during severe wave overtopping events, so the performance should be monitored in future.



General view of new promenade  
(Asset ref. No. 1221C901C0501C02)



View of new seawall and northern access ramp  
(Asset ref. No. 1221C901C0401C02)



View of new promenade surfacing at car park  
north of pumping station  
(Asset Ref. No. 1221C901C0501C03)



View down ramp access from new seawall at  
water treatment works.  
(Asset Ref. No. 1221C901C0501C02)



Southern end of new seawall at water  
treatment works.  
(Asset Ref. No. 1221C901C0501C02)



Tie in of seawall at water treatment works.  
(Asset Ref. No. 1221C901C0501C02)

### **Seaton Sands**

To the south of the sewage pumping station, the frontage is undefended and comprises of a relatively stable dune system which includes the Seaton Dunes Nature Reserve (photograph overleaf, left). As noted in previous years the dunes were well established and had a good coverage of vegetation. Local erosion was evident due to trampling from members of the public

walking through the dunes, with a lowering of the crest of the most seaward dune in several locations. As in previous years, local cliffing was observed towards the south in close proximity to the North Gare breakwater (below, right). The level of the dune crests generally increases to the south and a healthy beach is maintained along Seaton Sands by the North Gare breakwater.



View of dunes at Seaton Sands from near North Gare Breakwater.  
(Asset ref. No. 1221C901C0502C01)



Localised cliffing of the dunes immediately north of North Gare, adjacent to rubble revetment placed to manage outflanking.  
(Asset ref. No. 1221C901C0502C01)

### ***North Gare Breakwater***

The North Gare Breakwater is a private structure at the entrance to the Tees, marking the southern extent of Hartlepool BC's coastal frontage. As well as protecting the navigation channel the massive structure stabilises the shoreline to the north, retaining the beach and dune system, and also provides shelter to the beach located in the lee to the south where a stable dune field has developed. As reported in 2008, 2010 and 2012 the structure is in poor condition. However, despite the poor structural condition the massive structure remains effective in controlling shoreline change.



General view of North Gare breakwater, photo from 2012 report.  
(Asset ref. No. 1221C901C0502C01)

The North Gare breakwater remains in a dangerous condition with fencing and signs to deter members of the public from accessing the seaward section, see below left. However, it would be fairly easy to walk past this fencing on the adjacent foreshore to the south of the breakwater, below right.



Fencing and warning signs on North Gare breakwater.  
(Asset ref. No. 1221C901C0502C01)



Rubble / slag beach to the south side of North Gare Breakwater.  
(Asset ref. No. 1221C901C0502C01)

The breakwater has a multitude of ad-hoc repairs to the varied concrete and masonry structure. There was evidence of fairly recent repairs, but there are sections that are undercut and voids requiring ongoing work to stabilise the structure. As noted in previous years, the structure appears generally in better condition along its southerly, more sheltered side although significant damage was still evident locally, with loss of concrete render, evidence of settlement/displacement of previous concrete infill repairs and displaced/damaged slabs.



View of patch repairs to north side of breakwater  
(Asset ref. No. 1221C901C0502C01)



View of training wall and dunes to south of the breakwater in the Tees estuary mouth  
(Asset ref. No. 1221C901C0502C01)

#### **4. Comparison with Previous Assessment**

The previous formal assessment across the whole study frontage was undertaken in October 2012.

Comparative photographs have been included in the main text for a number of key locations. The condition of many of the hard defences along the frontage is very similar to the 2012 inspections although significant improvement works have been undertaken at Seaton Carew seawall. For most of the other assets, the 2014 inspections have generally identified further deterioration of defects in recorded in the 2008 and 2010 inspections, which were predominantly local defects not adversely affecting the overall performance of assets and with no large scale failures.

#### **5. Problems Encountered and Uncertainty in Analysis**

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

The seaward extent of the toes of some of the breakwaters / pier structures such as the North Pier, South Pier, Middle Pier, and Victoria Harbour entrance piers are submerged even at low tide and were therefore not inspected.

Victoria Harbour and Hartlepool Marina quay walls were not inspected since they are under private ownership and not classed as coastal defence assets.

The Heugh Breakwater, North Pier and North Gare Breakwater are not accessible to the public and therefore inspection of these structures is limited.

#### **6. Conclusions and Recommended Actions**

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

Although the scheme undertaken at the Town Wall in 2012 has secured the Scheduled Ancient Monument, there is an ongoing need to repair and maintain the structure due to weathering and abrasion of the masonry and pointing.

There remains a need for ongoing action at North Gare Breakwater which provides important shelter to the mouth of the River Tees and acts to retain Carr House Sands. The structure is in as poor condition and needs ongoing repairs to storm damage by its owners to sustain its function.

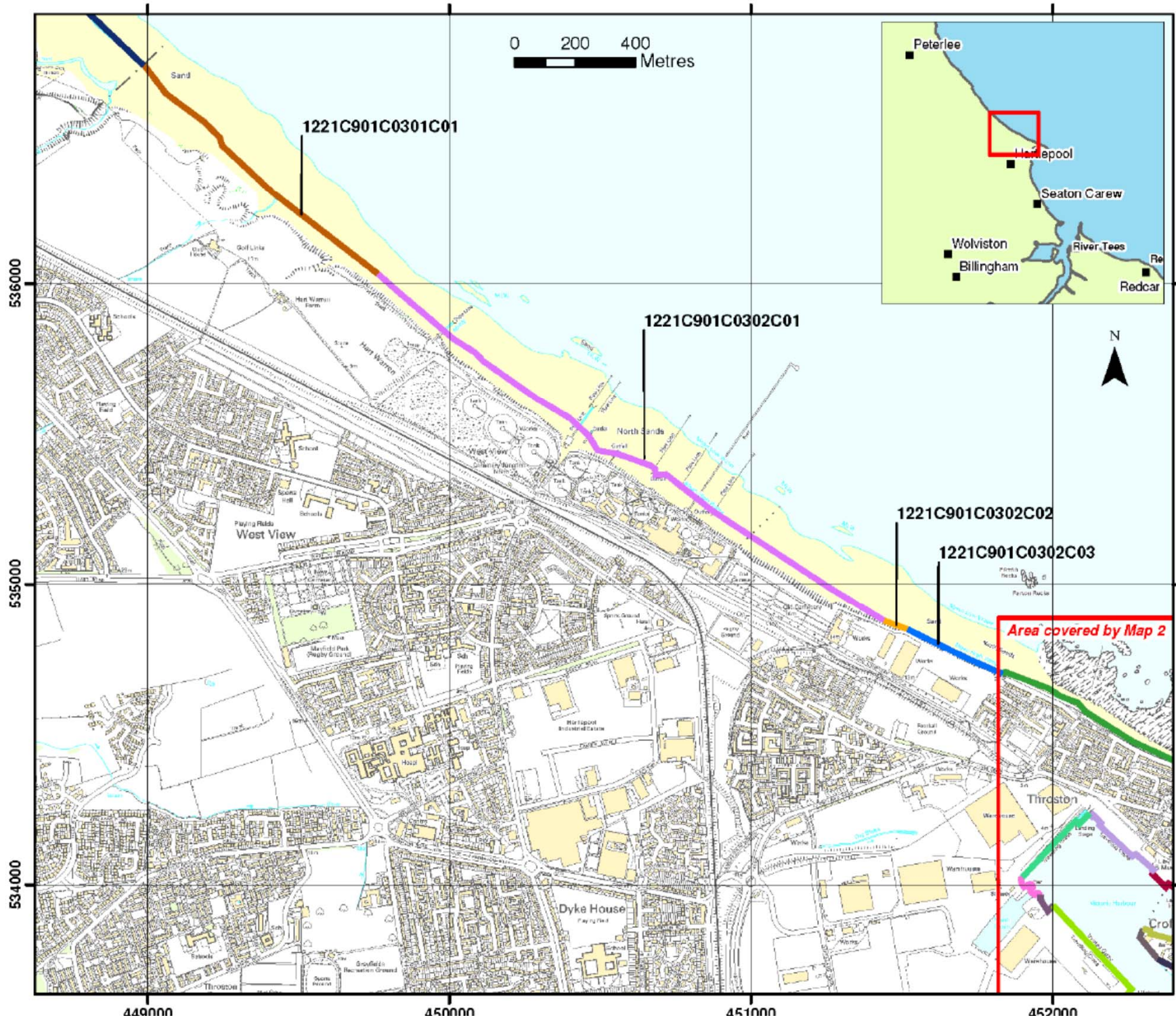
It is highly recommended that continued monitoring is undertaken for all assets, with specific recommendations for individual assets given in the table in Appendix B

# Appendices

# **Appendix A**

## **Asset Locations**





**Legend**

- Asset location
- NFCDD Asset Number

**Notes:**

All maps taken from 2010 Asset Inspection Reports and updated where necessary

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Lead Authority: Scarborough Borough Council

Project: Cell 1 Regional Coastal Monitoring Programme

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**Figure 1- Map 1**  
**Hartlepool Council Frontage**  
 Coastal Walkover Inspection Report

Drawing Scale 1:17,000 at A4

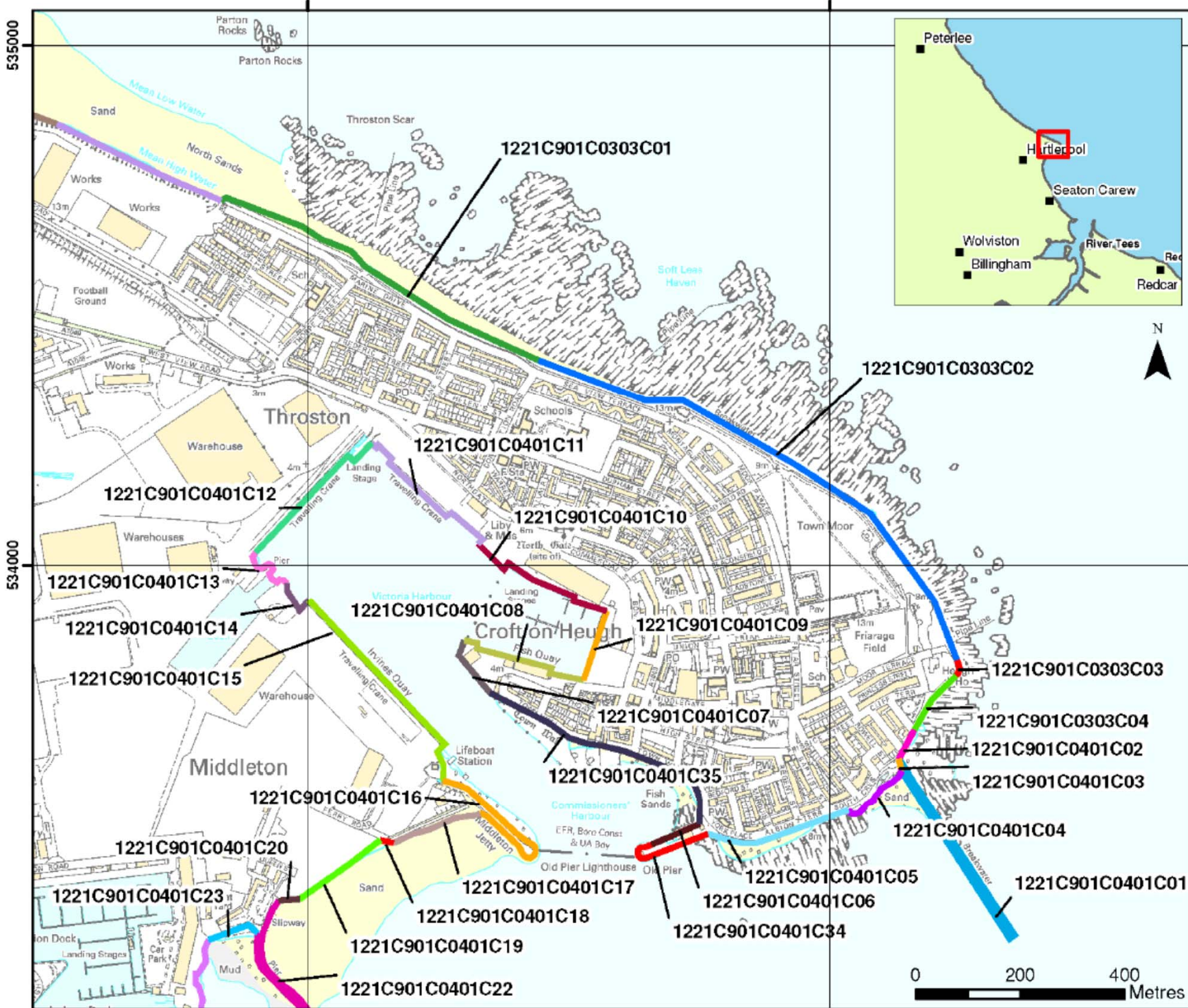
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**Legend**

- Asset location
- NFCDD Asset Number

**Notes:**

All maps taken from 2010 Asset Inspection Reports and updated where necessary

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Lead Authority: Scarborough Borough Council

Project: Cell 1 Regional Coastal Monitoring Programme

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**Figure 1 - Map 2**  
**Hartlepool Council Frontage**  
 Coastal Walkover Inspection Report

Drawing Scale 1:15,000 at A4

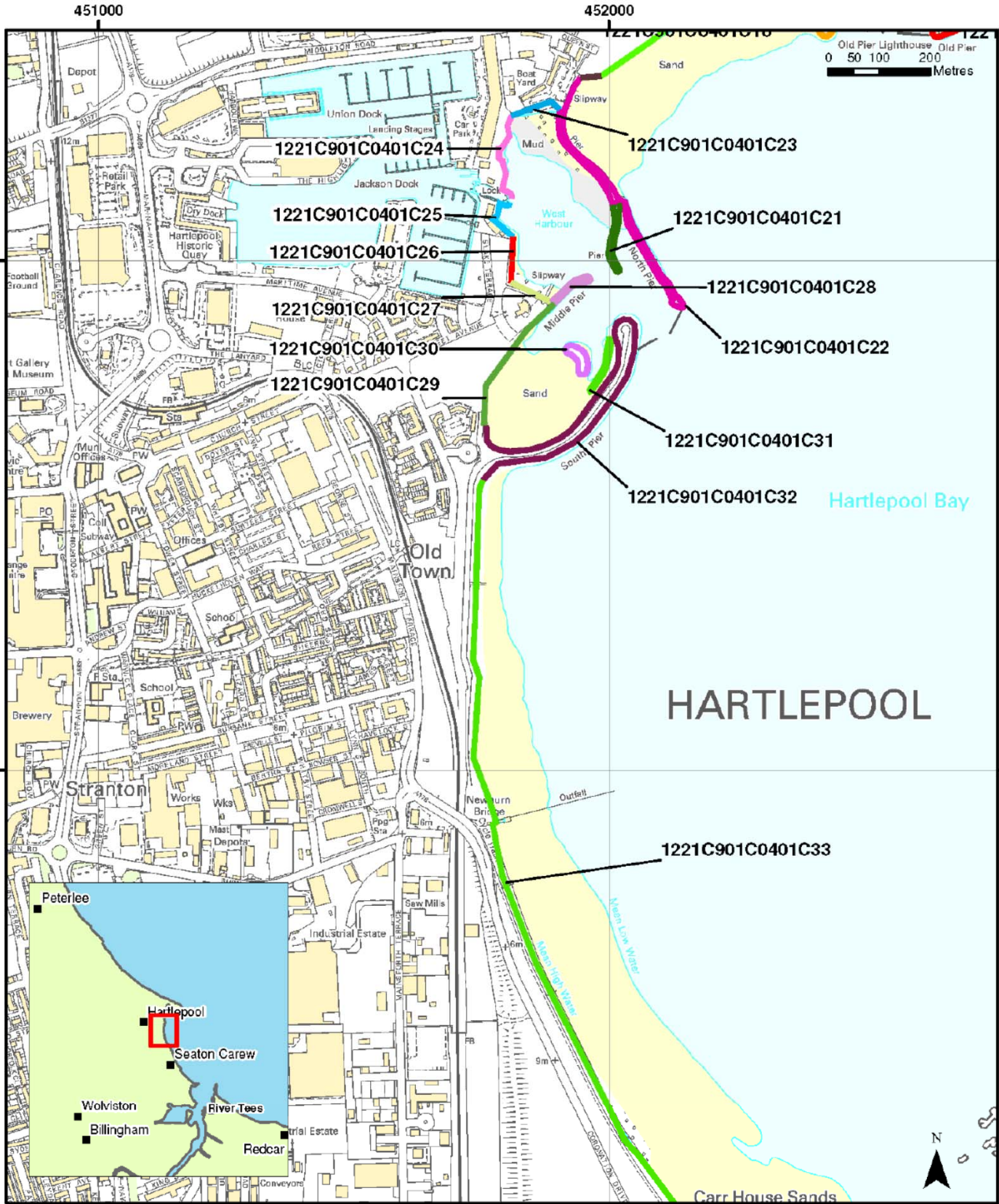
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**Legend**

- Asset location
- NFCDD Asset Number

Lead Authority: Scarborough Borough Council

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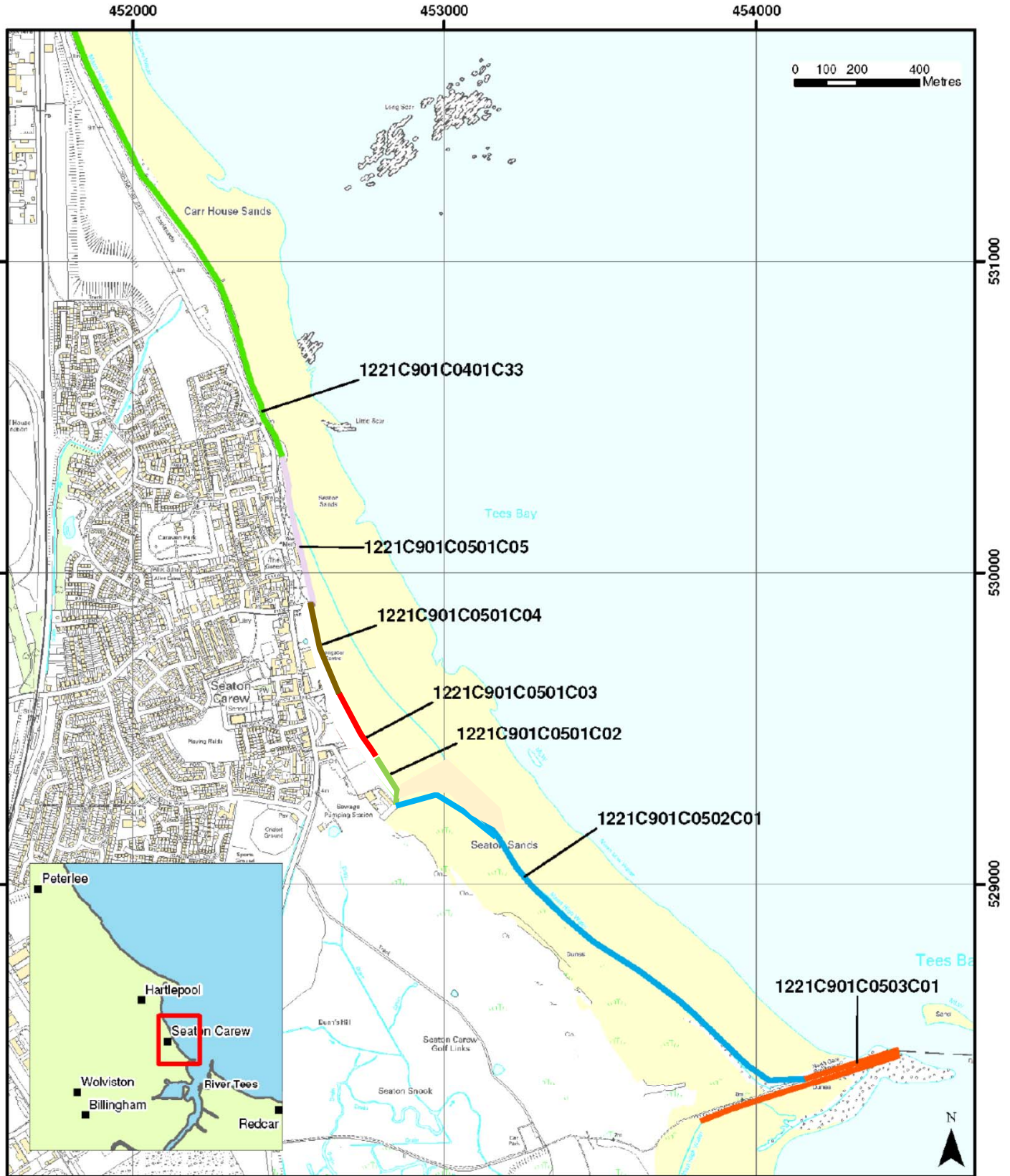
**Notes:**

All maps taken from 2010 Asset Inspection Reports and updated where necessary

**Figure 1 - Map 3  
 Hartlepool Council Frontage**

Coastal Walkover Inspection Report

Drawing Scale 1:10,000 at A4



**Legend**

— Asset location  
 — NFCCD Asset Number

Lead Authority: Scarborough Borough Council  
 Project: Cell 1 Regional Coastal Monitoring Programme

**Figure 1 - Map 4  
 Hartlepool Council Frontage**

Coastal Walkover Inspection Report  
 Drawing Scale 1:16,000 at A4

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**Notes:**

All maps taken from 2010 Asset Inspection Reports and updated where necessary

## **Appendix B**

# **Asset Condition & Recommendations Table**

Asset NFCDD Reference Number	Alternative Asset Reference	Description of Asset (As recorded in NFCDD)	Asset Type (As recorded in NFCDD)	Asset Location description (As recorded in NFCDD)	Asset Length (m)	Inspection Date	Inspection Comments for 2014	Overall Condition	Worst Condition	Residual Life	Recommendations	Urgency
1221C901C0301C01		Undefended	Undefended	NZ48983672, NZ49763603	1051.5	04/07/2014	Similar to 2012, although more erosion to south of beck, beach wide, dunes mostly vegetated,	2	4	>20	Monitor erosion, at Crimdon beck	no repairs
1221C901C0302C01		Undefended	Undefended	NZ49763603, NZ51443487	2070.3	04/07/2014	Obsolete structures mostly removed. Dunes appear to be generally accreting and relatively healthy, despite being low & narrow. Healthy beach in front of cemetery, narrows to S due to historical reclamation.	3	3	11 - 20	Continue to monitor	routine
1221C901C0302C02	CPSE-220/6701/01	670101 Brick filled welded mesh gabions with rubble above. Gabions in very poor condition.	Gabions	NZ51443487, NZ51523484	81.9	04/07/2014	As in 2012 very poor, / obsolete. Gabion baskets have failed / gone / been removed shedding bricks over foreshore, actively eroding. Works site above now demolished.	5	5	1 - 5	Monitor erosion and remove debris from obsolete defence	routine
1221C901C0302C03	CPSE-220/6702/01	Slag waste embankment with poured slag apron to toe.	Embankment	NZ51523484, NZ51833470	345.5	04/07/2014	Slag bank eroding as chemical apron breaking up. Rock armour placed at southern end to arrest outflanking of Marine Drive Sea Wall. Areas of undercutting and overhangs, although some vegetation on cliff in places.	4	4	1 - 5	Monitor effectiveness of rock armour at southern end.	no repairs
1221C901C0303C01	CPSE-220/6703/02	Upper revetment in need of repairs.	Seawall	NZ51833470, NZ52443439	691	04/07/2014	Short section of rock armour fronting the wall near its northern end. The wall is in fair to good condition. Repairs to the capping beam repairs are holding but more required Steps at mid length heavily abraded. Low beach exposing toe E of ramp.	3	3	>20	Extend repairs to toe E of ramp, monitor undermining.	urgent
1221C901C0303C02	CPSE-220/6704/01	Concrete block wall voiding to joints and spalling.	Wall	NZ52443439, NZ53243381	1037.6	04/07/2014	Spalling to face of many concrete blocks and capping beam. Cracking next to capping at most exposed section, where heavily overtopped. Toe protection has failed locally. Many repairs evident.	3	4	11 - 20	Continue local repair to damage to capping and toe protection.	routine
1221C901C0303C03	CPSE-220/6705/01	Concrete wall to Coastguard with toe (02).	Wall	NZ53243378, NZ53243381	33.1	04/07/2014	Concrete blocks have slightly stepped face. Repairs to capping beam are damaged in places. Extensive previous repairs. Recessed/missing mortar & void formation. Pitting of masonry.	3	3	>20	Continue inspection/maintenance. Local repair to spalling & abrasion.	routine
1221C901C0303C04	CPSE-220/6706/02	Concrete toe to high wall. Access ramp to part of length.	Apron	NZ53163368, NZ53243378	133	04/07/2014	Smaller blockwork. Fair to poor condition. Some missing sections of block facing at buttresses towards north end, extensive abrasion. Numerous previous repairs (some are now failing).	4	4	11 - 20	Repair damage at buttresses	urgent
1221C901C0401C01	CPSE-220/6708/01	Old breakwater, some repair carried out in 1990 but major problems forseen particularly at seaward end. Important protection to areas South.	Breakwater (Heugh Breakwater)	NZ53343328, NZ53133362	791.9	04/07/2014	Southern end of breakwater not inspected. Landward end in fair to good cond. Linear blockwork with no obvious missing blocks. No public access from mid-length, but seaward end is failing and in dangerous condition.	3	5	11 - 20	Detailed structural inspection - seaward end.	routine
1221C901C0401C02	CPSE-220/6707/01	Dressed stone wall continuing from pier.	Wall	NZ53133362, NZ53163368	62.2	04/07/2014	Considerable abrasion to lower courses reducing block thicknesses. Some pointing missing between blocks. Evidence of previous repairs.	3	3	>20	Replace missing pointing in joints. Monitor abrasion / replace blocks in future.	routine
1221C901C0401C03	CPSE-220/6709/01	Concrete and masonry wall poor in places. Protected by breakwater. Amenity area then wall to road and property behind.	Wall	NZ53133360, NZ53133362	23.5	04/07/2014	Short section of protected wall at root of Heugh breakwater. As previous 2010 & 12 inspections - No gaps between blocks. No displacement of blocks. Minor (local) abrasion.	2	2	>20	Continue inspection and maintenance regime.	routine

Green shading = condition improved since 2012  
Orange shading = condition worsened since 2012

Asset NFCDD Reference Number	Alternative Asset Reference	Description of Asset (As recorded in NFCDD)	Asset Type (As recorded in NFCDD)	Asset Location description (As recorded in NFCDD)	Asset Length (m)	Inspection Date	Inspection Comments for 2014	Overall Condition	Worst Condition	Residual Life	Recommendations	Urgency
1221C901C0401C04	CPSE-220/6710/01	New concrete wall but with some voiding to toe in places.	Wall	NZ53033353, NZ53133360	141	04/07/2014	Fronting Block Sands Paddling Pool, wall. As last inspection, fair, but with some abrasion and undermining / undercutting at the toe. Rear wall in fair condition.	3	3	>20	Infill voids at toe.	routine
1221C901C0401C05	CPSE-220/6711/02	Concrete wall as (01) but with high beach levels.	Wall	NZ52763348, NZ53033353	282.5	04/07/2014	Blockwork wall fronted by rocky forehore. As in 2012, cobble beach at crest level in centre. Spalling at crest at both ends of lower wall. Minor abrasion. Rear retaining wall gen good condition, but some cracking and missing mortar. New set of steps.	3	3	11 - 20	Repair spalling and damage.	routine
1221C901C0401C06	CPSE-220/6713/01	Concrete wall inside protection of jetty. Upper wall to road and houses.	Wall	NZ52653346, NZ52753350	101.2	04/07/2014	New handrail recently constructed. Some settlement and sagging of (original) masonry blockwork where Accropodes tail off.	3	3	11 - 20	Monitor settlement of blockwork. Rebuild or encase in future.	routine
1221C901C0401C07	CPSE-220/6736/01	673601 Blue brickwork quay.	Wall	NZ52343375, NZ52293385	123.7	31/03/1998	Quay walls to Victoria Harbour basin not inspected under the regional Monitoring programme.	3	3	>20		no repairs
1221C901C0401C08	CPSE-220/6737/01	673701 Timber suspended deck Fish Quay.	Wall	NZ52293385, NZ52523377	259.8	31/03/1998		3	3	>20		no repairs
1221C901C0401C09	CPSE-220/6738/01	673801 Masonry quay wall.	Wall	NZ52523377, NZ52573391	139.1	31/03/1998		3	3	>20		no repairs
1221C901C0401C10	CPSE-220/6739/01	673901 Rubble revtment to Quay.	Revetment	NZ52323404, NZ52573391	302.7	31/03/1998		3	3	>20		no repairs
1221C901C0401C11	CPSE-220/6740/01	674001 Sheet steel piling with suspended dock in front.	Piling	NZ52123423, NZ52333405	319.1	31/03/1998		2	2	>20		no repairs
1221C901C0401C12	CPSE-220/6741/01	674101 Suspended deck concrete quay on concrete piles.	Piling	NZ51903402, NZ52123423	320.5	31/03/1998		2	2	>20		no repairs
1221C901C0401C13	CPSE-220/6742/01	674201 Masonry quay wall with apron.	Wall	NZ51893401, NZ51963396	131.4	31/03/1998		3	3	>20		no repairs
1221C901C0401C14	CPSE-220/6743/01	674301 Rubble revetment.	Revetment	NZ51983391, NZ51963396	86.2	31/03/1998		2	2	>20		no repairs

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1221C901C0401C15	CPSE-220/6744/01	674401 Sheet steel pile and steel tubular pile quay wall with concrete coping.	Wall	NZ52253358, NZ52003393	455.5	31/03/1998		1	1	>20		no repairs
1221C901C0401C16	CPSE-220/6715/01	Concrete armour units to breakwater with slag core. Acts to protect to North and retain beach to South.	Breakwater	NZ52253358, NZ52433345	378.1	04/07/2014	Accropodes armoured breakwater. As in 2012 inspection. Armouring providing good coverage to core. Appears good condition. Build up of rubble beach on west side.	2	2	>20	N/A	no repairs
1221C901C0401C17	CPSE-220/6716/01	Brick filled welded gabions fronted by rock armour revetment. Protects RNLI, boat club and industrial property.	Gabions	NZ52163346, NZ52323352	175.2	04/07/2014	Brick filled gabions form wall with stepped profile, some distorted /displaced / locally settled, but little change since 2012. Rock armour revetment with variable size armour to south, high beach to north. .	3	3	11 - 20	Monitor settled gabions. Add more rock / reprofile rock armour.	routine
1221C901C0401C18		Undefended	Undefended	NZ52133347, NZ52163346	26.4	04/07/2014	Informal access point to the beach to armour the shore between the revetment and wall. Some additional rubble placed since 2012. Steep slope at southern side of access ramp. potential instability with adjacent defence.	4	4	11 - 20	Monitor end of defences for outflanking, place more rock armour.	no repairs
1221C901C0401C19	CPSE-220/6717/01	Warehouse and industrial property above. Blockwork wall.	Seawall	NZ51983336, NZ52133347	189.7	04/07/2014	W 1/3 is older conc block wall. E 2/3 is near vertical loose stacked small block retaining wall. E wall has some missing blocks & coping and has worsened since 2012. Local widening of construction joints. W wall has damaged / missing faces to blocks.	3	4	11 - 20	Fill voids. Replace missing blocks.	routine
1221C901C0401C20	CPSE-220/6718/01	Concrete block wall with commercial property above.	Wall	NZ51943335, NZ51983336	40.5	04/07/2014	Continuation of wall to east. Badly abraded / spalling blockwork with damaged blocks. Cracks in coping units.	3	3	11 - 20	Infill voids. Local repair to abrasion/spalling.	routine
1221C901C0401C21	CPSE-220/6745/02	New concrete head to masonry breakwater.	Breakwater (Inner arm of North Pier)	NZ52013297, NZ52013311	279.3	04/07/2014	No public access along piers so only partly inspected from distance. Appears fair condition. Missing mortar between masonry and spalling of masonry blocks. Concrete head in fair condition.	3	3	>20	Detailed structural survey including boat/dive survey.	routine
1221C901C0401C22	CPSE-220/6719/01	Breakwater and root wall to sheds and protection of redeveloped harbour area.	Breakwater (North Pier)	NZ52143290, NZ51943335	1033.5	04/07/2014	Repairs at N end holding. No public access - insp from dist. Some deterioratn since 2012. Missing /recessed mortar, loose/missing masonry. Cracks and voids in apron. Decaying timber piles visible at toe E side. Steelpiiles (W) fair cond where visible	4	4	11 - 20	Repair voids in apron adjacent to beach. Grout voids. Boat survey to end.	urgent
1221C901C0401C23	CPSE-220/6746/01	Rock armour revetment.	Revetment	NZ51803328, NZ51903329	105	04/07/2014	No change from 2012 survey - Relatively new rock revetment in fair condition. Former stepped stone revetment evident beneath rock armour. Some damage to wide concrete crest slab.	3	3	>20	Repair damage to promenade.	routine
1221C901C0401C24	CPSE-220/6747/01	Massive masonry quay wall.	Wall	NZ51803312, NZ51803328	188.9	04/07/2014	Masonry faced flood wall on top of quay wall. in good visual cond as in 2012. Ties into lock gate at slight lower level. Lower quay wall mix of conc and masonry, gen fair to good condition. Seaweed prevented inspection of lower wall.	3	3	>20	Private survey from boat.	routine
1221C901C0401C25	CPSE-220/6748/01	New concrete block quay wall with a block revetment apron.	Wall	NZ51813304, NZ51803311	110.3	04/07/2014	As in 2012: Block wall appears good cond Lower apron could not be inspected due to seaweed coverage.	2	2	>20	Monitor again in 2 yrs	no repairs

Green shading = condition improved since 2012  
Orange shading = condition worsened since 2012



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1221C901C0401C26	CPSE-220/6749/02	Concrete splash wall to precast concrete block revetment.	Revetment	NZ51803295, NZ51813304	89.7	04/07/2014	Good condition apart from one local area of settlement in block sett revetment (approx 2m diameter) very little change since 2012	3	3	>20	Repair the area of settlement	routine
1221C901C0401C27	CPSE-220/6750/01	Block wall with rubble foreshore.	Wall	NZ51803295, NZ51883291	87.1	04/07/2014	Undercutting of toe to concrete apron at access steps and wall both sides of slipway has worsened since 2012.	3	4	>20	Infill voids at toe. Add toe armour. Make good steps and slipway.	routine
1221C901C0401C28	CPSE-220/6752/02	Masonry structure with concrete head.	Wall (Middle Pier)	NZ51883291, NZ51963296	187.3	04/07/2014	As prev inspection: Some gaps due to mortar loss. Lower structure largely obscured by seaweed. Vegetation growth in construction joints of deck. Rock toe revetment to outer face fair to good where visible.	3	3	>20	Repointing. Remove vegetation from deck.	routine
1221C901C0401C29	CPSE-220/6752/02	Masonry quay wall with later addition of upper concrete wall.	Wall	NZ51763267, NZ51893291	289.8	04/07/2014	As 2012 survey: Some gaps due to mortar loss in lower courses. Crest wall in good condition. Lower blockwork obscured by seaweed.	3	3	>20	Repointing lower courses.	routine
1221C901C0401C30		undefended	undefended	NZ51943277, NZ51923283	161.9	04/07/2014	Rock breakwater island . Looks in good condition. Rock armour has consistent profile - no significant displacement.	2	3	>20	n/a	no repairs
1221C901C0401C31	CPSE-220/6753/01	Old breakwater within harbour.	Breakwater	NZ51963274, NZ51993284	229.6	04/07/2014	As per last survey, Slowly deteriorating old quay wall. Voids and spalling evident between masonry blocks. Redundant / historic structure as main breakwater provides protection. Vegetation growth on deck.	3	3	>20	N/A	no repairs
1221C901C0401C32	CPSE-220/6720/02	Concrete unit armour to breakwater on rock core.	Armour	NZ51753256, NZ52023288	964.3	04/07/2014	No change since previous inspection: Rock armour on lee side, concrete accropode armour on seaward side. Appears good condition, but seaward face not inspected - would need boat survey. Bushes growing in rock armour need removing before cause damage.	2	3	>20	Remove vegetation from structure. Boat survey of outer face & seaward end at LW.	routine
1221C901C0401C33		Concrete recurved splash wall above concrete wall and behind rock armour. Promenade and development land behind.	Recurved Wall	NZ51733228, NZ51753256	2381.1	04/07/2014	As 2012: Crest wall good, minor mainly aesthetic defects locally at jts. No significant visible defects in concrete. Rock revet density fairly consistent, with crest and bank profile intact, but some minor displacement of rocks, especially near steps.	2	2	>20	Minor local repairs to concrete surface, steps and rails.	routine
1221C901C0401C34	CPSE-220/6712/01	Fishing breakwater with armoured head. Important protection to inner area.	Breakwater	NZ52633345, NZ52763348	181.3	04/07/2014	Concrete wall with accropode protection at seaward end. The wall is in fair condition, with the revetment good. Cracking in deck adjacent to wall and through crest wall - has been repaired in places. Repair recently undertaken to section of conc prom.	3	4	>20	Minor concrete repairs locally and grout voids / cracks.	routine
1221C901C0401C35	CPSE-220/6714/02	Masonry apron to toe of wall over mid section.	Apron	NZ52343375, NZ52753354	509.1	04/07/2014	Town Wall. Concrete apron toe protection (2012) in good condition. 3 groynes also replaced. Minor voids and recessed/lost mortar in places. Groynes do not extend to wall. Crest wall in poor condition, loss of lime render, missing blocks (landward side)	3	4	>20	Repointing / repair to crest wall. Consider extending groynes to wall.	routine
1221C901C0501C02	CPSE-220/6734/01	Low crest wall to lower concrete plinth above high sands. CarPark and pump station behind.	Wall	NZ52852928, NZ52762940	146.1	04/07/2014	New flood wall protecting foul water treatment works and pumping station. As new condition. Promenade appears to have standard paving slabs, as new condition, but may be susceptible to wave overtopping damage?	1	1	>20	Monitor performance of prom surfacing.	routine

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1221C901C0501C03	CPSE-220/6733/01	Concrete revetment. High accreting sand levels moving into dune area.	Revetment	NZ52692944, NZ52762940	100.3	04/07/2014	As new condition. Previous defence replaced by new vertical seawall since 2012 inspection. Wide healthy beach in front of wall.	1	1	>20	Monitor new wall	no repairs
1221C901C0501C04	CPSE-220/6732/01	Crest wall in fair condition some minor repair needed.	Wall	NZ52692944, NZ52582990	500.3	04/07/2014	This wall has been replaced with a new vertical wall since previous inspection. Realigned at N end to tie in with ramp and wall to N. As new condition.	1	1	>20	Monitor.	routine
1221C901C0501C05	CPSE-220/6731/01	Concrete wall generally in fair condition but beach low by Northern corner and evidence of voiding in promenade. Corner of wall interacts with waves lowering beach levels.	Wall	NZ52582990, NZ52483037	482.8	04/07/2014	Access steps const in 2012 as new. Beach higher than in 2012. Prom v good. Rock crest lowers to S. Repairs to coping and joints appear to be holding well. New tie in wall and ramp to S.	2	2	>20	Repairs to joints / cracks as required.	routine
1221C901C0502C01		Undefended	Undefended	NZ52852928, NZ54152837	1755.2	04/07/2014	As 2012 survey: Wide dune field appears relatively stable - good cover of est. vegetation. Localised areas of non vegetated dune. Localised erosion caused by public makeshift footpaths through dunes.	2	3	>20	Localised trampling - consider fencing to control access.	no repairs
1221C901C0503C01	CPSE-220/6735/02	North Gare Breakwater	Breakwater	NZ53822823, NZ54452844	986.7	04/07/2014	Multiple adhoc repairs with poured concrete placed since 2012. Closed to public. Massive structure retains beach and dune systems to north and south, condition based on function is fair, but structurally appears poor / very poor in places.	4	5	6 - 10	Monitor for outflanking at root. Maintain integrity of structure.	urgent

