



**Cell 1 Regional Coastal Monitoring Programme  
Update Report 13: 'Partial Measures' Survey 2021**

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## Abbreviations and Acronyms

Acronym / Abbreviation	Definition
AONB	Area of Outstanding Natural Beauty
DGM	Digital Ground Model
HAT	Highest Astronomical Tide
LAT	Lowest Astronomical Tide
MHWN	Mean High Water Neap
MHWS	Mean High Water Spring
MLWS	Mean Low Water Neap
MLWS	Mean Low Water Spring
m	metres
ODN	Ordnance Datum Newlyn

## Water Levels Used in Interpretation of Changes

Water Level Parameter	Water Level (m AOD)
	River Tyne
1 in 200 year	3.7
HAT	3.1
MHWS	2.4
MLWS	-1.9

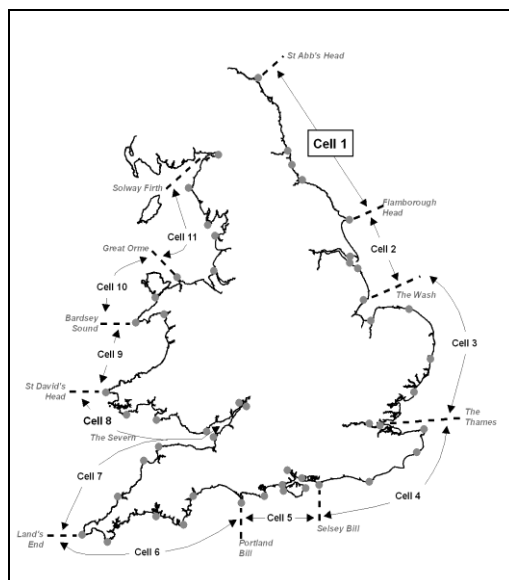
**Source:** *Scottish Border to River Tyne Shoreline Management Plan 2.*  
Royal Haskoning, May 2009.

## 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 intertidal 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).



**Figure 1 Sediment Cells in England and Wales**

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
- LiDAR surveys
- walk-over cliff and coastal defence asset surveys

The beach profile surveys, topographic surveys and cliff top recession surveys are undertaken as a 'Full Measures' survey in autumn every year. Some of these surveys are then repeated the following spring as part of a 'Partial Measures' survey.

To date the following reports have been produced:

**Table 1 Analytical, Update and Overview Reports Produced to Date**

Year		Full Measures		Partial Measures		Cell 1 Overview Report
		Survey	Analytical Report	Survey	Update Report	
1	2008/09	Sep-Dec 08	May 09	Mar-May 09	Jun 09	
2	2009/10	Sep-Dec 09	Mar 10	Feb-Mar 10	Jul 10	
3	2010/11	Aug-Nov 10	Feb 11	Feb-Apr 11	Aug 11	Sep 11
4	2011/12	Oct-Nov 11	Oct 12	Mar-May 12	Feb 13	
5	2012/13	Sep-Oct 12	Mar 13	Mar-Apr 13	Jun 13	
6	2013/14	Sep-Oct 13	Feb 14	Mar-Apr 14	Jul 14	
7	2014/15	Oct-Nov 14	Feb 15	Mar 15	Jul 15	
8	2015/16	Oct-Nov 15	Feb 16	Mar 16	Jul 16	Jun 16
9	2016/17	Sep 16	Feb 17	Mar 17	Jul 17	
10	2017/18	Sep-Oct 17	Feb 18	Mar 18	May 18	
11	2018/19	Sep-Oct 18	Jan 19	Feb-Mar 19	Aug 19	
12	2019/20	Sep-Nov 19	Dec 19	Mar 20	Mar 20	
13	2020/21	Sep 20	Nov 20	Mar 21	Apr 21 (*)	Expected Summer 21

(\*) The present report is **Update Report 13** and provides an analysis of the 2021 Partial Measures survey for North Tyneside Council's frontage.

## **1. Introduction**

### **1.1 Study Area**

North Tyneside Council's frontage extends from Hartley (just south of Blyth) in the north to River Tyne in the south. For the purposes of this report and for consistency with previous reporting, it has been sub-divided into four areas, namely:

- Whitley Sands
- Cullercoats Bay
- Tynemouth Long Sands
- King Edward's Bay

### **1.2 Methodology**

Along North Tyneside Council's frontage, the following surveying is undertaken:

- Full Measures survey annually each autumn comprising:
  - Beach profile surveys along eight transect lines (commenced 2002)
  - Beach profile surveys along an additional two transects (commenced 2010)
  - Topographic survey along Whitley Sands (commenced 2010)
  - Topographic survey along Tynemouth Long Sands (commenced 2011)
- Partial Measures survey annually each spring comprising:
  - Beach profile surveys along all ten transect lines (commenced 2010)

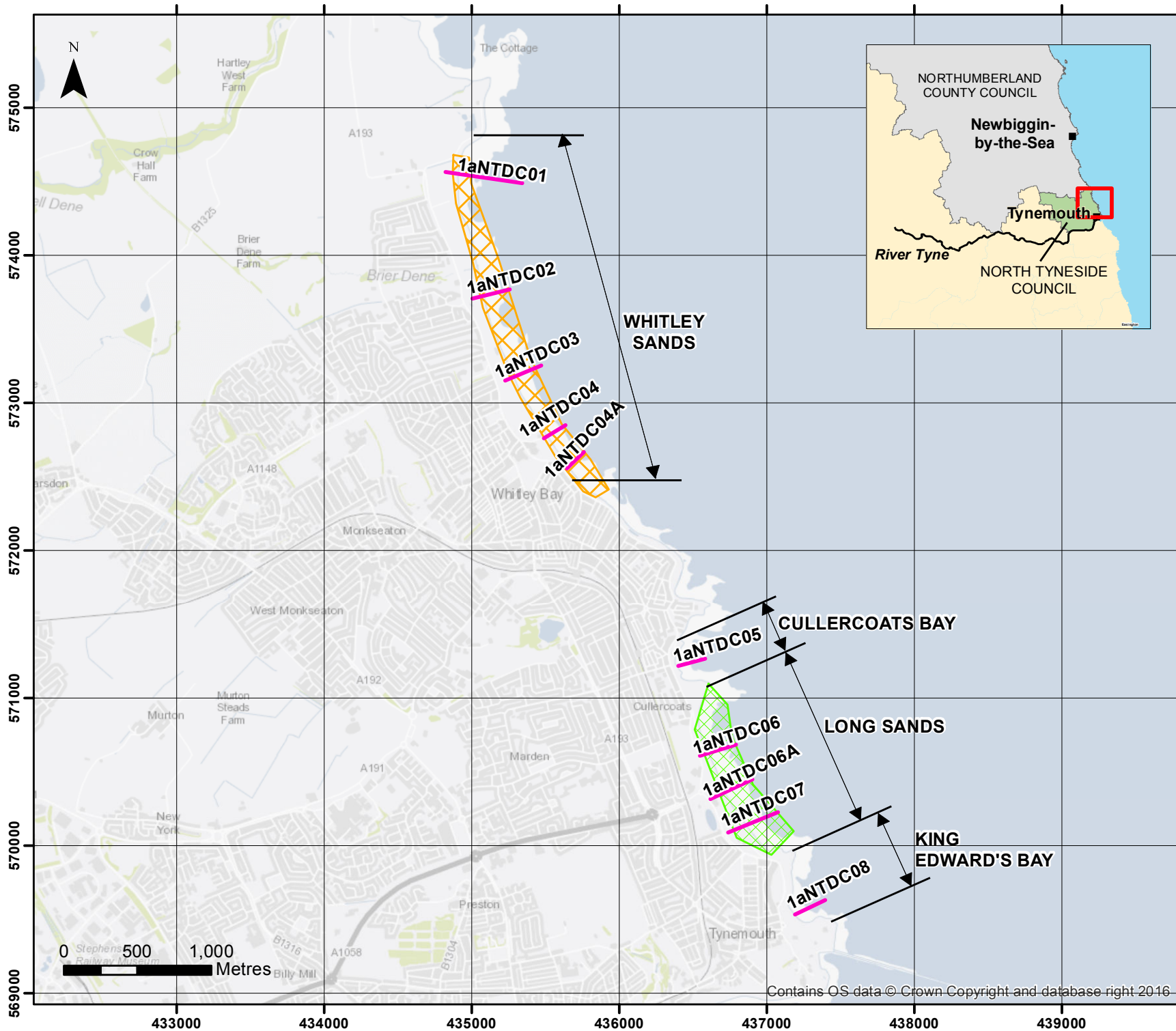
The location of these surveys is shown in Figure 2. The Partial Measures 2020 surveys were undertaken along this frontage on the 1<sup>st</sup>-4<sup>th</sup> March 2021. During this time weather conditions varied; refer to the survey reports for details of the weather conditions over this survey period.

The Update Report presents the following:

- description of the changes observed since the previous survey and an interpretation of the drivers of these changes (Section 2);
- documentation of any problems encountered during surveying or uncertainties inherent in the analysis (Section 3);
- recommendations for 'fine-tuning' the programme to enhance its outputs (Section 4); and
- providing key conclusions and highlighting any areas of concern (Section 5).

Data from the present survey are presented in a processed form in the Appendices.





Key

**SURVEY LOCATIONS**

**Topographic Profiles**

- Annual
- Bi-Annual

**Topographic Surveys**

- 6 monthly
- yearly
- 5 yearly

*(Indicative Survey Extents shown)*

Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

**Figure 2 - Map 1**

**North Tyneside Council Frontage**

Analytical Report  
Topo Surveys

Drawing Scale at A4 1:35,000

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## 2. Analysis of Survey Data

### 2.1 Whitley Sands

Survey Date	Description of Changes Since Last Survey	Interpretation
1 <sup>st</sup> -4 <sup>th</sup> Mar 2021	<p><b>Beach Profiles:</b></p> <p>Whitley Sands is covered by five beach profile lines for the Partial Measures survey (Appendix A). Four of these (1aNTDC01 to 1aNTDC04) were initially surveyed in April 2002 and were then re-surveyed annually to 2009 (Full Measures, autumn 2009) after which time they have been surveyed bi-annually. From March 2010 (Partial Measures, spring 2010) onwards, an additional beach profile line (NTDC04A) has been surveyed at the southern end of the frontage for the same time periods listed above. All profiles were last surveyed in September 2020 for the Full Measures survey.</p> <p><b>1aNTDC01</b> is located in the north of Whitley Sands, along the undefended cliffs immediately south of Trinity Road car park. According to the survey report, the cliff was not measured due to dangerous access and there was evidence of a rock fall. There has been lowering by up to 0.8m on the upper beach, from the toe of the cliff to chainage 64m. Seaward of chainage 64m, the profile shows accretion of up to 1.5m on the middle beach and 0.1m on the lower beach. Overall, the profile is at a medium level on the upper and lower beach and a high level on the middle beach compared to the range recorded from previous surveys.</p> <p>Profile <b>1aNTDC02</b> is located towards the north of Whitley Sands. From the sea wall to 126m chainage the elevation of the beach has decreased by up to 1.2m compared to the previous survey. From chainage 126m to the end of the survey, the beach levels have increased by up to 1.1m, forming a small berm at chainage 146m. The upper and middle beach are at a low level compared to the range recorded from previous surveys, particularly between chainages 102-122m which is at its lowest level recorded. The lower beach is at a high level compared to the range recorded from previous surveys, particularly between chainages 145-156m which is at its highest level recorded.</p> <p>Profile <b>1aNTDC03</b> is located at the centre of Whitley Sands. Beach levels have decreased between the sea wall across the upper and middle beach to chainage 83m by up to 1.0m. Seawards of chainage 83m, the beach level has risen by up to 0.9m, forming a small berm at chainage 95m. The upper and middle beach is at a low level compared to the range recorded from previous surveys, particularly</p>	<p>Since the last survey, beach levels in the north and centre of Whitley Sands have generally eroded across the upper to middle beach and accreted on the lower beach, exhibiting draw down of sediment from the upper to lower beach over winter. Beach levels in the south of Whitley Sands (1aNTDC04 and 1aNTDC04A) have eroded across the entire profile length.</p> <p><b>Longer term trends:</b></p> <p>The data show that profiles are generally within the bounds of previous surveys, however several sections experienced their highest (145-156m at 1aNTDC02) and lowest (102-122m at 1aNTDC02, 26-65m at 1aNTDC03 and 0-20m at 1aNTD04A) levels recorded.</p>

Survey Date	Description of Changes Since Last Survey	Interpretation
	<p>between chainages 26-65m which is at its lowest level recorded. The lower beach is at a high level.</p> <p>Profile <b>1aNDC04</b> is located to the south of Whitley Sands. There has been erosion between the base of the seawall and chainage 24m by up to 0.3m, switching to small section of accretion of up to 0.2m to chainage 29m, before switching to erosion across the rest of the beach profile. Erosion ranges from 0.6m on the middle beach, exposing some rocks at chainage 64m, to 0.4m on the lower beach. Overall, the beach is at a medium-low level compared to the range recorded from previous surveys.</p> <p>Profile <b>1aNTDC04a</b> is located to the south of Whitley Sands. The entire beach profile has lowered evenly by 1.0m, exposing the previously covered rocky shore platform between chainages 72m to 95m. The entire beach is at a low level compared to the range recorded from previous surveys, particularly between chainages 0-20m which is at its lowest level recorded.</p>	

## 2.2 Cullercoats Bay

Survey Date	Description of Changes Since Last Survey	Interpretation
1 <sup>st</sup> -4 <sup>th</sup> Mar 2021	<p><b>Beach Profiles:</b></p> <p>Cullercoats Bay is covered by one beach profile line for the Partial Measures survey (Appendix A). This was surveyed annually each autumn between 2002 and 2009. From spring 2010 onwards, it has been surveyed bi-annually. The last survey was the September 2020 Full Measures survey.</p> <p>The cliff at <b>1aNTDC05</b> is not measured (through agreement) due to dangerous access. There has been accretion from the foot of the cliff at chainage 25m to 42m of up to 0.2m across the upper beach, and between chainages 90-134m of up to 0.4m on the lower beach. The middle beach between chainages 42-90m has lowered by up to 0.3m. Overall the beach is at a medium level on the upper to middle beach and at a high level on the lower beach compared to the range recorded from previous surveys.</p>	<p>There has been a flattening of the upper to middle beach to create a smoother profile.</p> <p><b>Longer term trends:</b> The beach levels observed are within the bounds of previous surveys, indicating generic behaviour with no clear trend.</p>

## 2.3 Tynemouth Long Sands

Survey Date	Description of Changes Since Last Survey	Interpretation
1 <sup>st</sup> -4 <sup>th</sup> Mar 2021	<p><b>Beach Profiles:</b></p> <p>Tynemouth Long Sands is covered by three beach profile lines for the Partial Measures survey (Appendix A). Profiles 1aNTDC06 and 1aNTDC07 were initially surveyed annually each autumn between 2002 and 2009. A third profile, 1aNTDC06A, was later added in the centre of the frontage. From spring 2010 (Partial Measures) onwards, they have been surveyed bi-annually. The last survey was the September 2020 Full Measures survey.</p> <p><b>1aNTDC06</b> is located approximately 150m south of the access road/ramp towards the north of the bay. The profile for the dune-cliff face is limited due to a lack of data points in the profile plot; the survey report for this monitoring period and previous survey reports have noted “<i>no access to middle of section 6 due to seed protection fences</i>”. There has been accretion from the toe of the dune-cliff to chainage 52m of up to 0.3m. An upper beach berm has eroded between chainages 52-81m. The middle beach between chainages 81-161m has lowered by up to 0.6m, switching to accretion on the lower beach by up to 1.4m. Overall the profile is at a medium level compared to the range recorded from previous surveys.</p> <p>At profile <b>1aNTDC06A</b>, the profile for the dune-cliff face is a straight line; a result of a lack of data points in the profile plot; the survey report for this monitoring period and previous survey reports have noted “<i>no access to middle of section 6A due to seed protection fences</i>”. The upper beach has accreted from the toe of the cliff to chainage 95m by up to 0.1m, switching to lowering between chainages 95-216m by up to 0.4m, resulting in a steeper upper and middle beach profile. The lower beach has accreted between chainages 216-240m by up to 0.2m, before switching to lowering until the end of the profile at chainage 271m by up to 0.5m. Overall, the profile is at medium level compared to the range recorded from previous surveys.</p> <p>Profile <b>1aNTDC07</b> is located approximately 50m south of the access route through the dunes towards the southern end of the bay. As with the other profiles the dune-cliff face is a straight line; a result of a lack of data points in the profile plot. The survey report for this monitoring period and earlier reports note “<i>no access to middle of section 7 due to seed protection fences</i>”. The beach profile has experienced variable erosion and accretion limited to <math>\pm 0.3</math>m from the toe of the dunes to the end of the profile.</p>	<p>At Tynemouth Long Sands, the dune-cliff face was not surveyed due to access constraints, but survey photographs suggest that wind-blown sand continues to accrete in the lee of the defences.</p> <p>Beach profile change has been relatively small over the winter/spring months. Beach levels at the cliff toe have generally accreted, before switching to lowering across the middle and lower beach (except in the north where the lower beach has accreted).</p> <p><b>Longer term trends:</b> Overall, the beaches have retained a similar form and are within the bounds of previous surveys.</p>

Survey Date	Description of Changes Since Last Survey	Interpretation
	Overall, the beach is at a relatively high level compared to the range recorded from previous surveys.	
<b>March 2021</b>	<p><b>Topographic Survey:</b></p> <p>The first survey for Tynemouth Long Sands was undertaken for the Full Measures survey in October 2010.</p> <p>Data from the current topographic survey have been used to create a digital ground model (DGM) (Appendix B – Map 1) using a Geographical Information System (GIS). A difference plot has also been produced by comparing the current DGM (Appendix B – Map 2) with that produced from the last topographic survey (September 2020).</p> <p>The difference plot shows that accretion / little change has dominated at the toe of the cliff across the bay. A wide band of erosion dominates across the middle beach, except at the northern-most end of the bay which has undergone accretion, and at the southern-most end of the bay, which has undergone little change (<math>\pm 0.1\text{m}</math>). The lower beach is dominated by accretion from the north to the centre of the bay, whilst the lower beach at the southern-most end of the bay has eroded. Overall, change is generally limited to <math>\pm 0.0.75\text{m}</math>, though there is a narrow band of erosion up to 1.5m toward the north of the bay.</p>	Since the last survey, the beach at Tynemouth Long Sands is generally dominated by accretion / little change at the toe of the cliff, switching to erosion on the middle beach, and accretion on the lower beach.

## 2.4 King Edward's Bay

Survey Date	Description of Changes Since Last Survey	Interpretation
1 <sup>st</sup> -4 <sup>th</sup> Mar 2021	<p><b>Beach Profiles:</b></p> <p>King Edward's Bay is covered by one beach profile line for the Full Measures survey (Appendix A). This was surveyed annually each autumn between 2002 and 2009. From spring 2010 onwards, it has been surveyed bi-annually. The last survey was the September 2020 Full Measures survey.</p> <p>At profile <b>1aNTDC08</b> there has been variable change across the profile. The upper beach alternates between sections of lowering and accretion, limited to <math>\pm 0.4\text{m}</math>. There is little change on the upper-middle beach, however the middle-lower beach erodes by 0.2m to chainage 122m before switching to accretion across the lower beach by up to 0.6m. The upper and middle beach are at a medium-low level and the lower beach is at a high level compared to the range recorded from previous surveys.</p>	<p>Since the last survey, the beach at King Edward's Bay beach has seen variable change. In general, the upper and middle beach has steepened.</p> <p><b>Longer term trends:</b> Changes recorded across the beach since the last survey are within the range of historical beach levels.</p>

### **3. Problems Encountered and Uncertainty Analysis**

#### **Individual Profiles**

- At profiles 1aNTDC01 and 1aNTDC05 (through prior agreement) the cliff was not measured due to dangerous access. Future surveys at 1aNTDC05 shall start at the cliff toe and the cliff position should instead be monitored from aerial survey data.
- At Tynemouth Long Sands (profiles 1aNTDC06, 1aNTDC06A and 1aNTDC07) there was no access to the dunes in the middle of the profile due to seedling protection fences. This means it has not been possible to directly monitor the effectiveness of the dune stabilisation scheme, although observations have been made from the survey photographs.

#### **Topographic Survey**

- No problems were encountered.

### **4. Recommendations for 'Fine-tuning' the Monitoring Programme**

It is recommended that the effectiveness of the stabilisation fences installed at the dunes along Tynemouth Long Sands be monitored by means of walkover inspection and aerial photography, rather than trampling in the restricted access sections.

### **5. Conclusions and Areas of Concern**

- At Whitley Sands, beach levels have generally lowered across the upper to middle beach and accreted on the lower beach in the north of the survey area and eroded across the beach profile in the south of the survey area. For the most part, the upper beach is at a high level across the bay, whilst middle to lower beach levels across the bay are at a medium-low level. Beach levels should continue to be monitored in the next survey to check for signs of recovery or further erosion.
- At Cullercoats Bay, at profile 1aNTDC05, there has been a flattening of the upper to middle beach to create a smoother profile, but there are no causes for concern.
- At Tynemouth Long Sands, the dune face was not surveyed due to access constraints. Beach profile change has generally shown accretion at the toe of the cliff before switching to erosion across the middle and lower beach. The topographic survey is generally dominated by accretion at the toe of the cliff, followed by erosion across the middle beach and accretion on the lower beach. Overall, the north and central beach is at a medium level, whilst the south is at a relatively high level compared to the range recorded from previous surveys. There are no causes for concern.
- At King Edward's Bay, the beach has undergone variable change, however in general the upper and middle beach has steepened. There are no causes for concern.



## **Appendices**

**Appendix A**  
**Beach Profiles**

The following sediment feature codes are used on some profile plots:

<b>Code</b>	<b>Description</b>
S	Sand
M	Mud
G	Gravel
GS	Gravel & Sand
MS	Mud & Sand
B	Boulders
R	Rock
SD	Sea Defence
SM	Saltmarsh
W	Water Body
GM	Gravel & Mud
GR	Grass
D	Dune (non-vegetated)
DV	Dune (vegetated)
F	Forested
X	Mixture
FB	Obstruction
CT	Cliff Top
CE	Cliff Edge
CF	Cliff Face
SH	Shell
ZZ	Unknown

# Beach Profile

Location: 1aNTDC01

Date: 04/03/2021

Inspector: AG

Low Tide:

Low Tide Time:

Wind

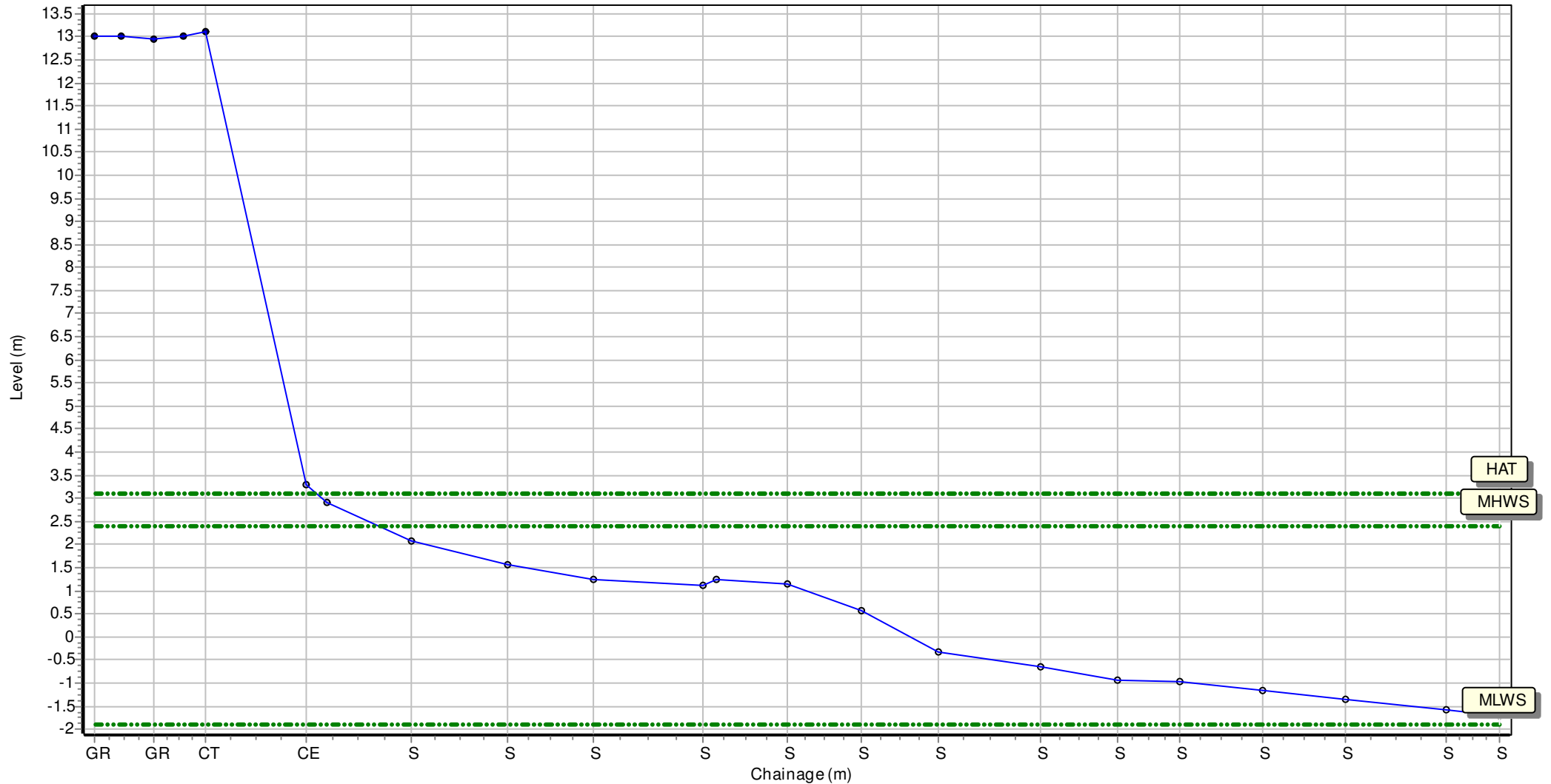
Sea State:

Visibility:

Rain:

Summary: 2021 Partial Measures Topo Survey

Easting: 434851.079 Northing: 574565.379 Profile Bearing: 99 ° from North



# Beach Profile

Location: 1aNTDC02

Date: 04/03/2021

Inspector: AG

Low Tide:

Low Tide Time:

Wind

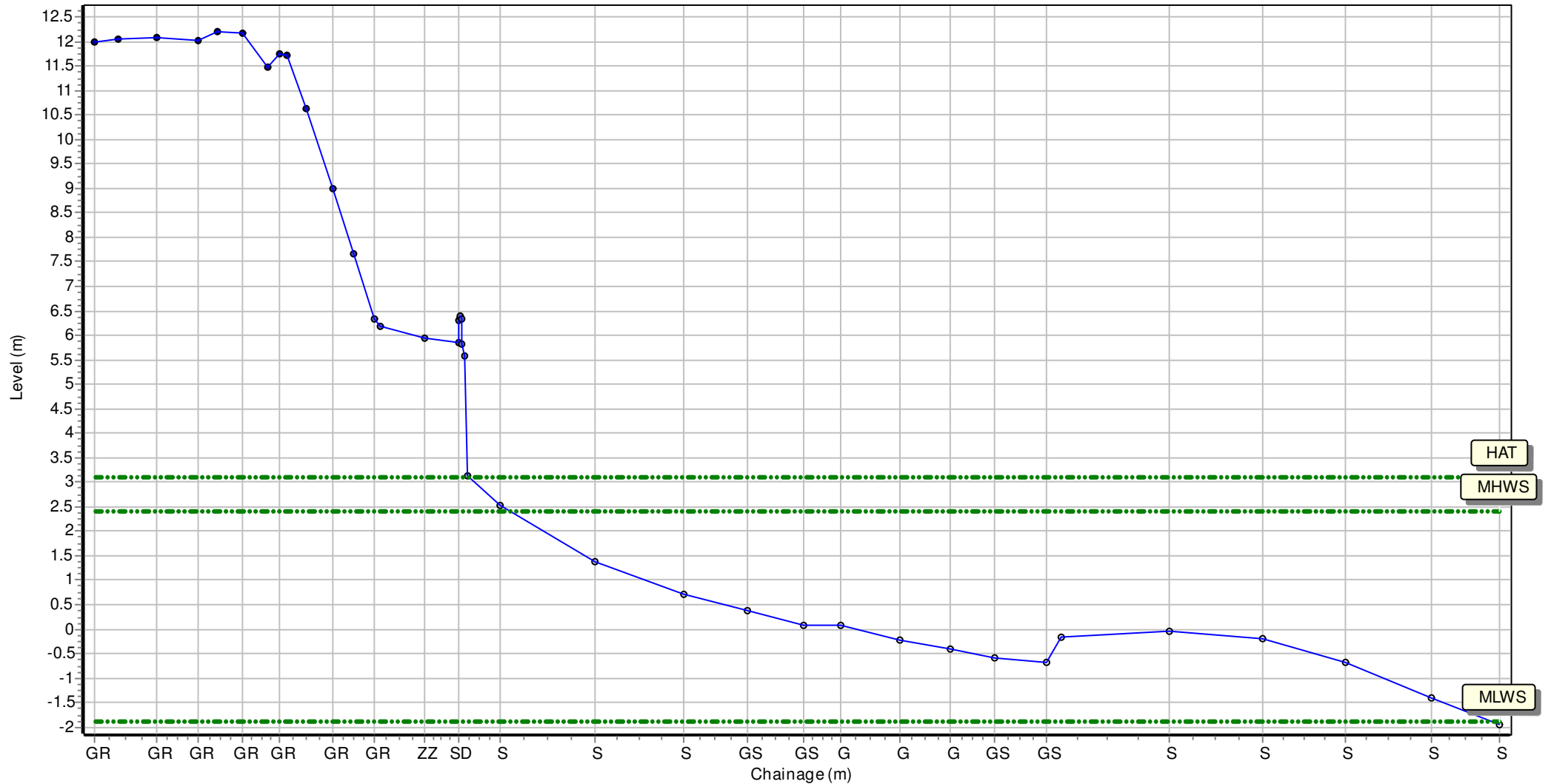
Sea State:

Visibility:

Rain:

Summary: 2021 Partial Measures Topo Survey

Easting: 435030.395 Northing: 573704.317 Profile Bearing: 76 ° from North



# Beach Profile

Location: 1aNTDC03

Date: 04/03/2021

Inspector: AG

Low Tide:

Low Tide Time:

Wind

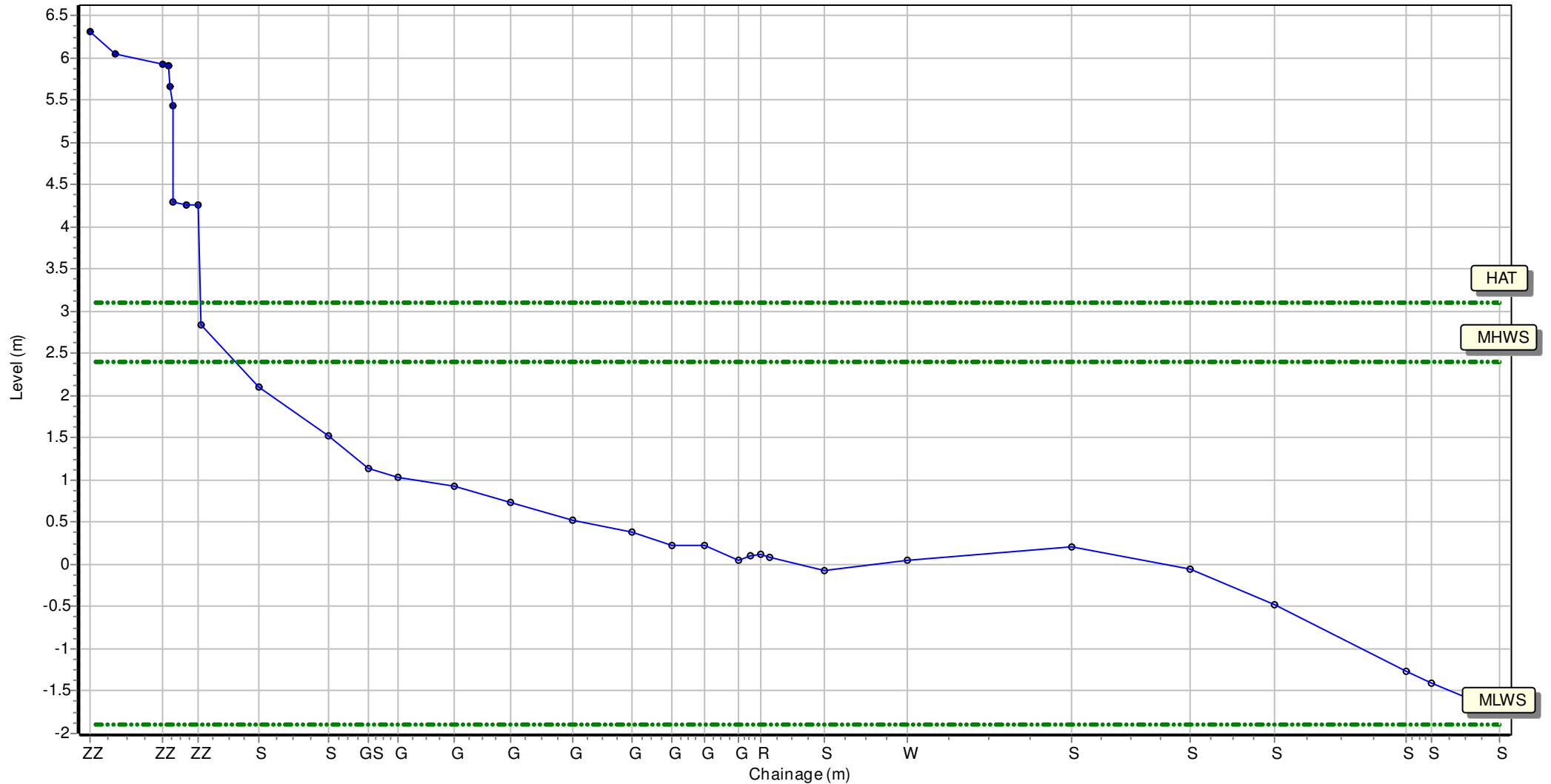
Sea State:

Visibility:

Rain:

Summary: 2021 Partial Measures Topo Survey

Easting: 435270.865 Northing: 573151.795 Profile Bearing: 70 ° from North



# Beach Profile

Location: 1aNTDC04

Date: 04/03/2021

Inspector: AG

Low Tide:

Low Tide Time:

Wind

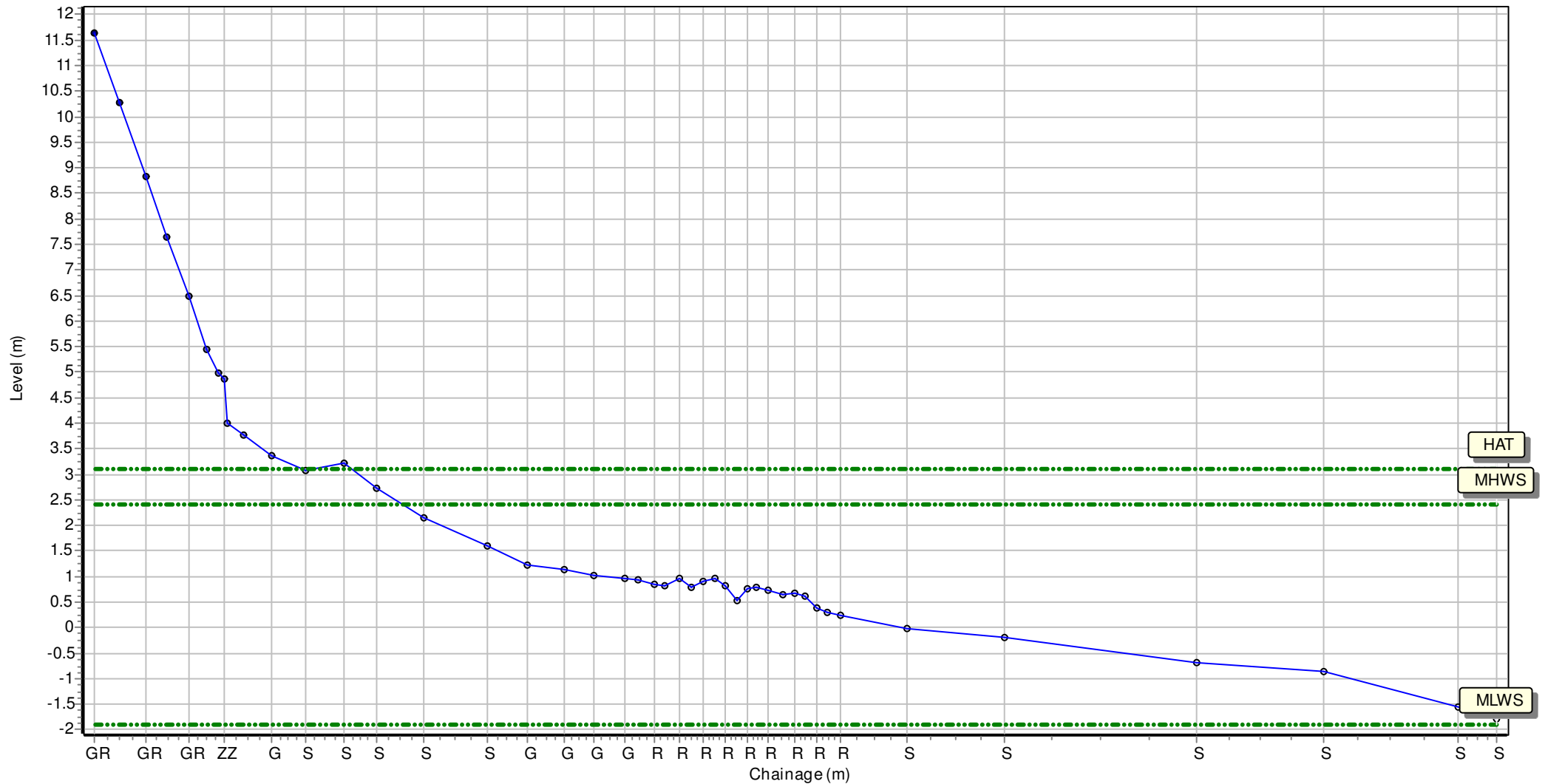
Sea State:

Visibility:

Rain:

Summary: 2021 Partial Measures Topo Survey

Easting: 435490.594 Northing: 572746.234 Profile Bearing: 60 ° from North



# Beach Profile

Location: 1aNTDC04A

Date: 04/03/2021 Inspector: AG

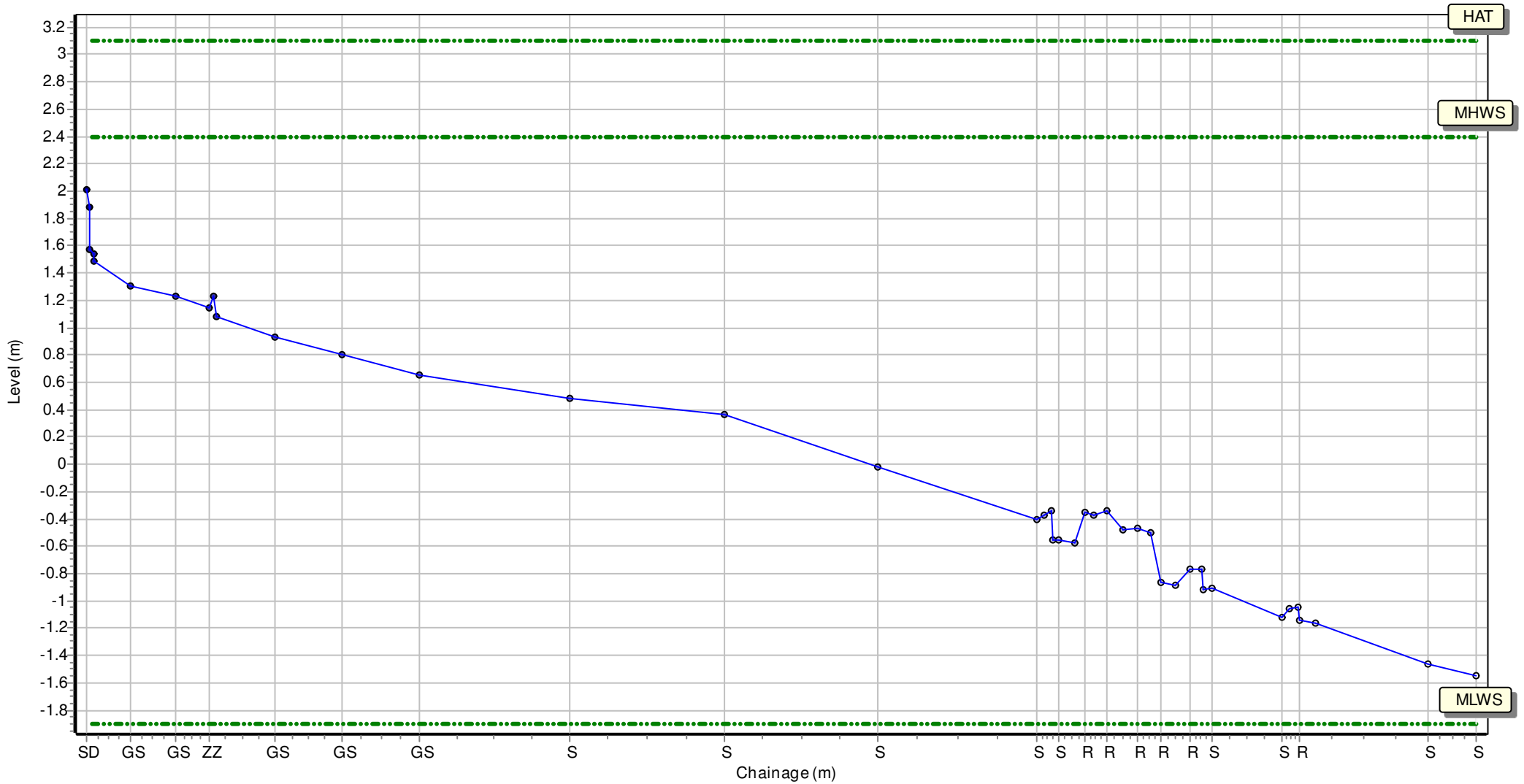
Low Tide: Low Tide Time:

Wind Sea State:

Visibility: Rain:

Summary: 2021 Partial Measures Topo Survey

Easting: 435645.554 Northing: 572557.615 Profile Bearing: 46 ° from North





# Beach Profile

Location: 1aNTDC05

Date: 01/03/2021

Inspector: AG

Low Tide:

Low Tide Time:

Wind

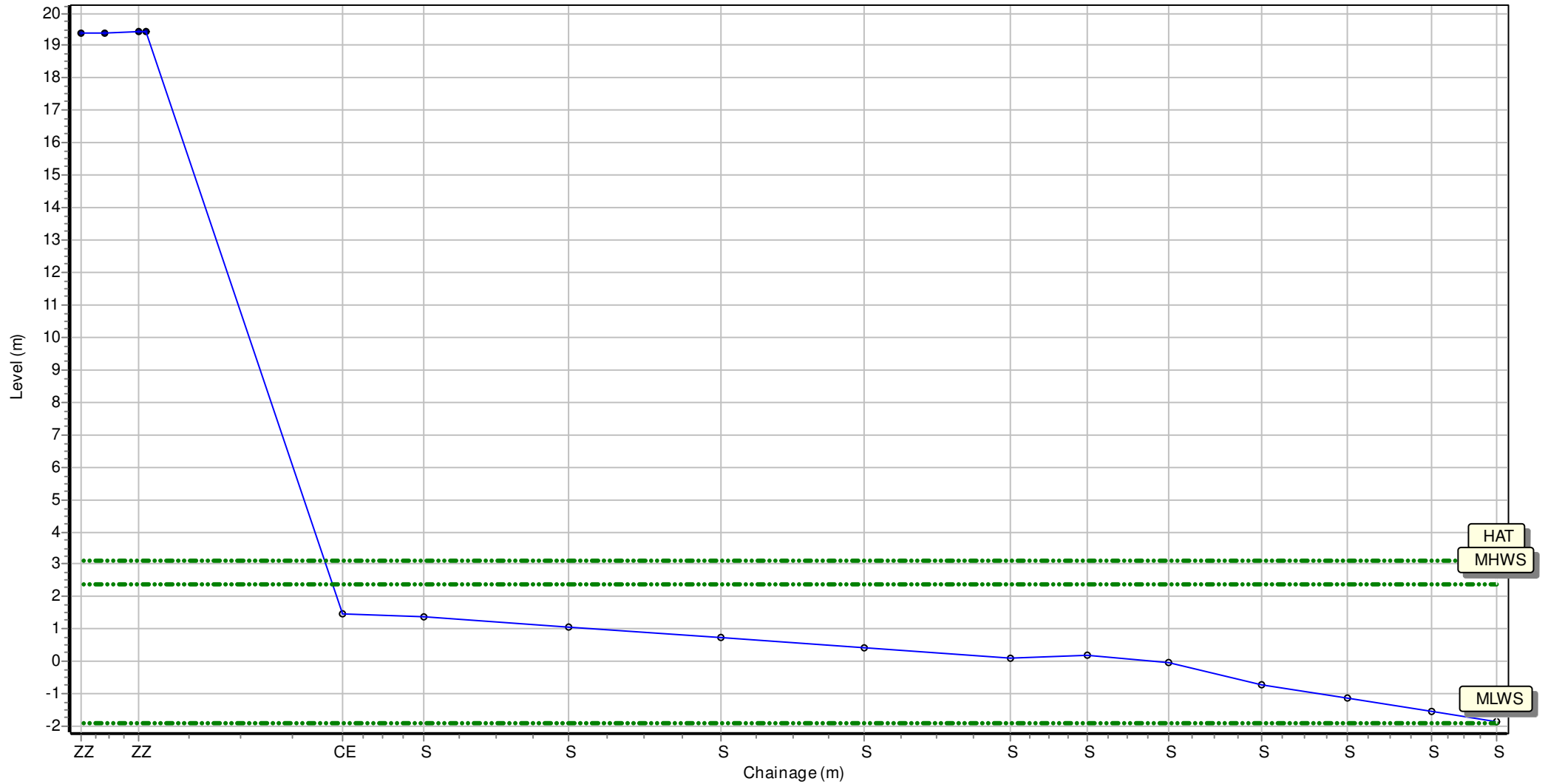
Sea State:

Visibility:

Rain:

Summary: 2021 Partial Measures Topo Survey

Easting: 436365.005 Northing: 571217.518 Profile Bearing: 77 ° from North



# Beach Profile

Location: 1aNTDC06

Date: 01/03/2021

Inspector: AG

Low Tide:

Low Tide Time:

Wind

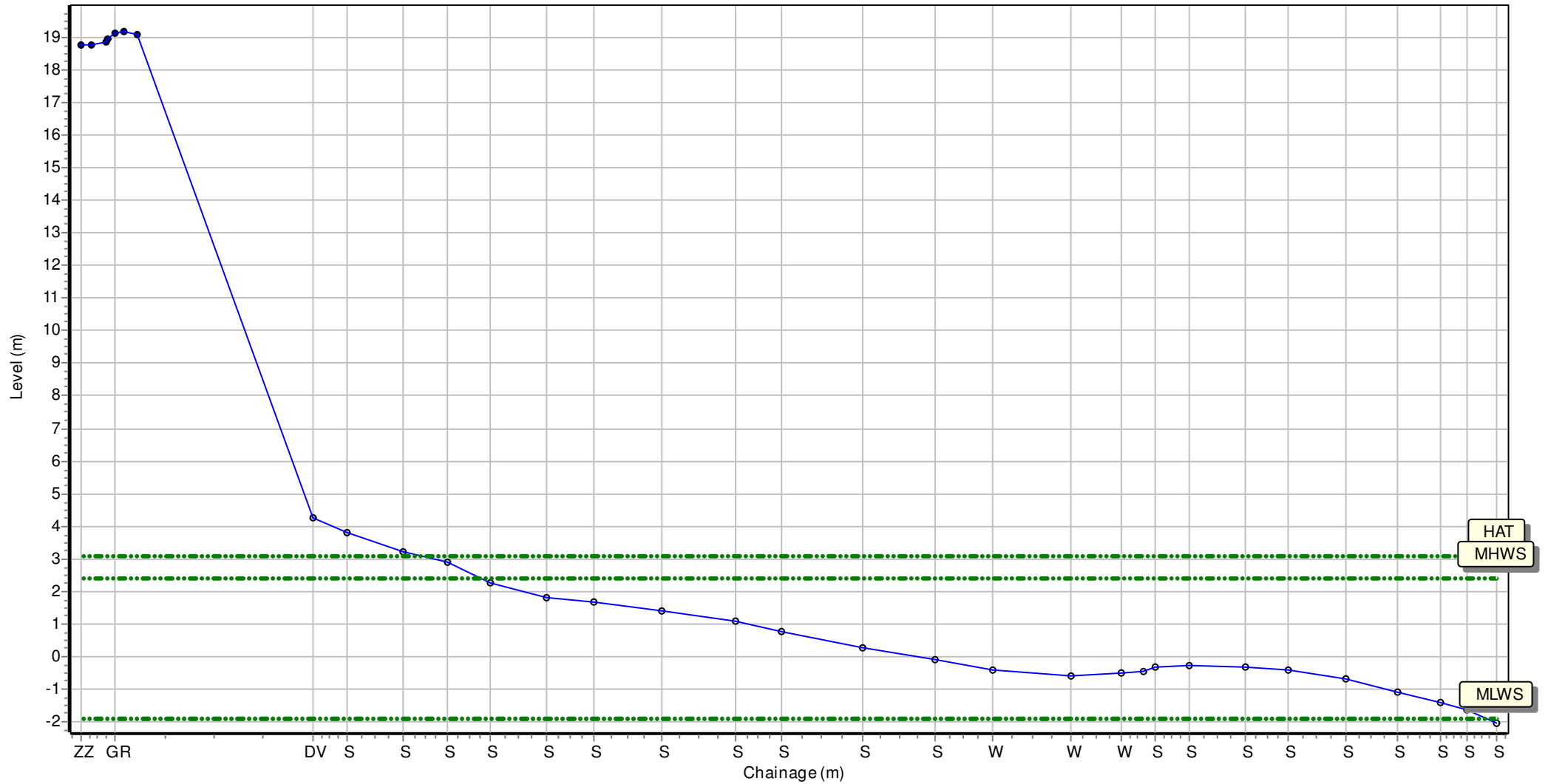
Sea State:

Visibility:

Rain:

Summary: 2021 Partial Measures Topo Survey

Easting: 436550.6 Northing: 570613.529 Profile Bearing: 77 ° from North



# Beach Profile

Location: 1aNTDC06A

Date: 01/03/2021 Inspector: AG

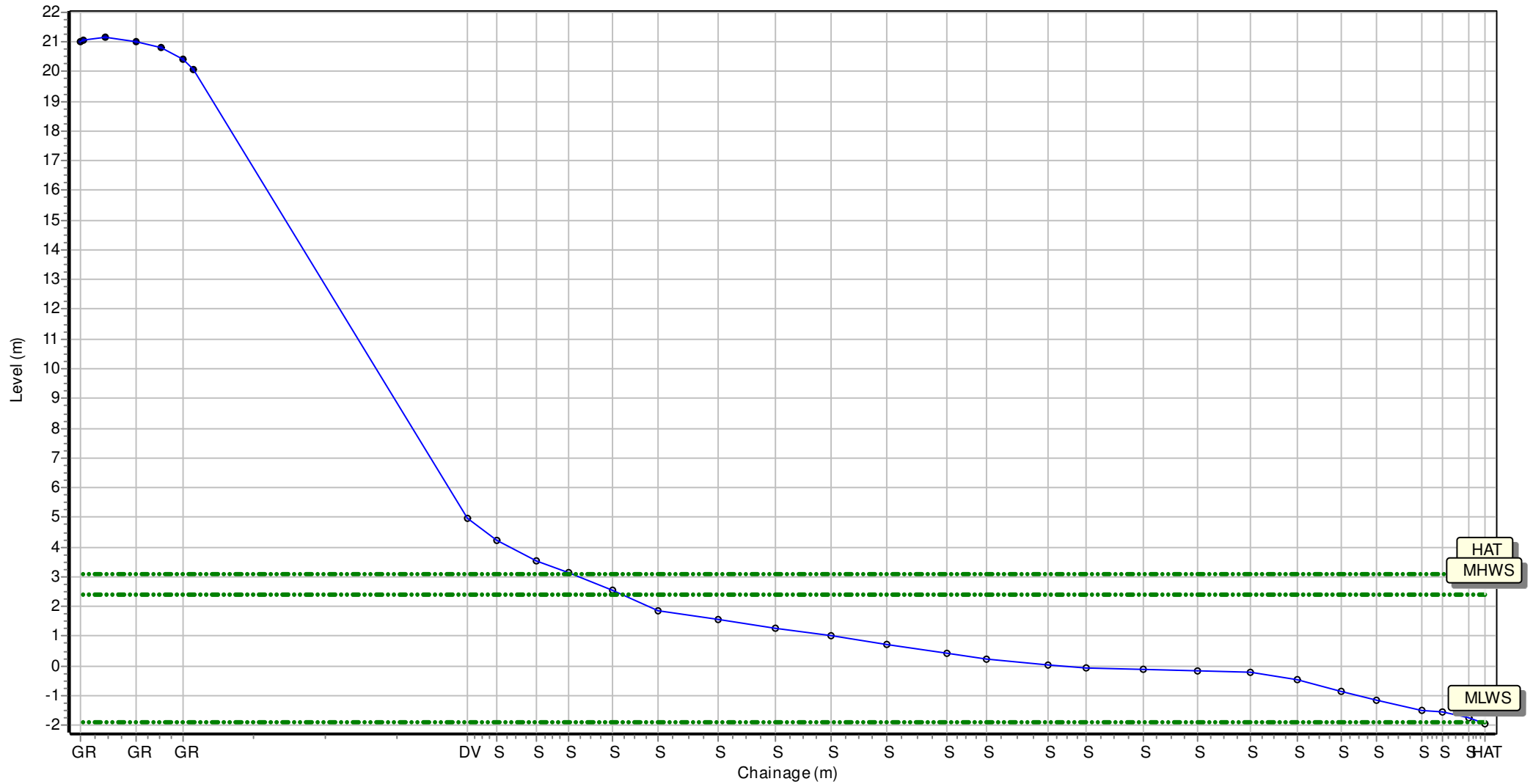
Low Tide: Low Tide Time:

Wind Sea State:

Visibility: Rain:

Summary: 2021 Partial Measures Topo Survey

Easting: 436620.512 Northing: 570317.533 Profile Bearing: 65 ° from North



# Beach Profile

Location: 1aNTDC07

Date: 01/03/2021

Inspector: AG

Low Tide:

Low Tide Time:

Wind

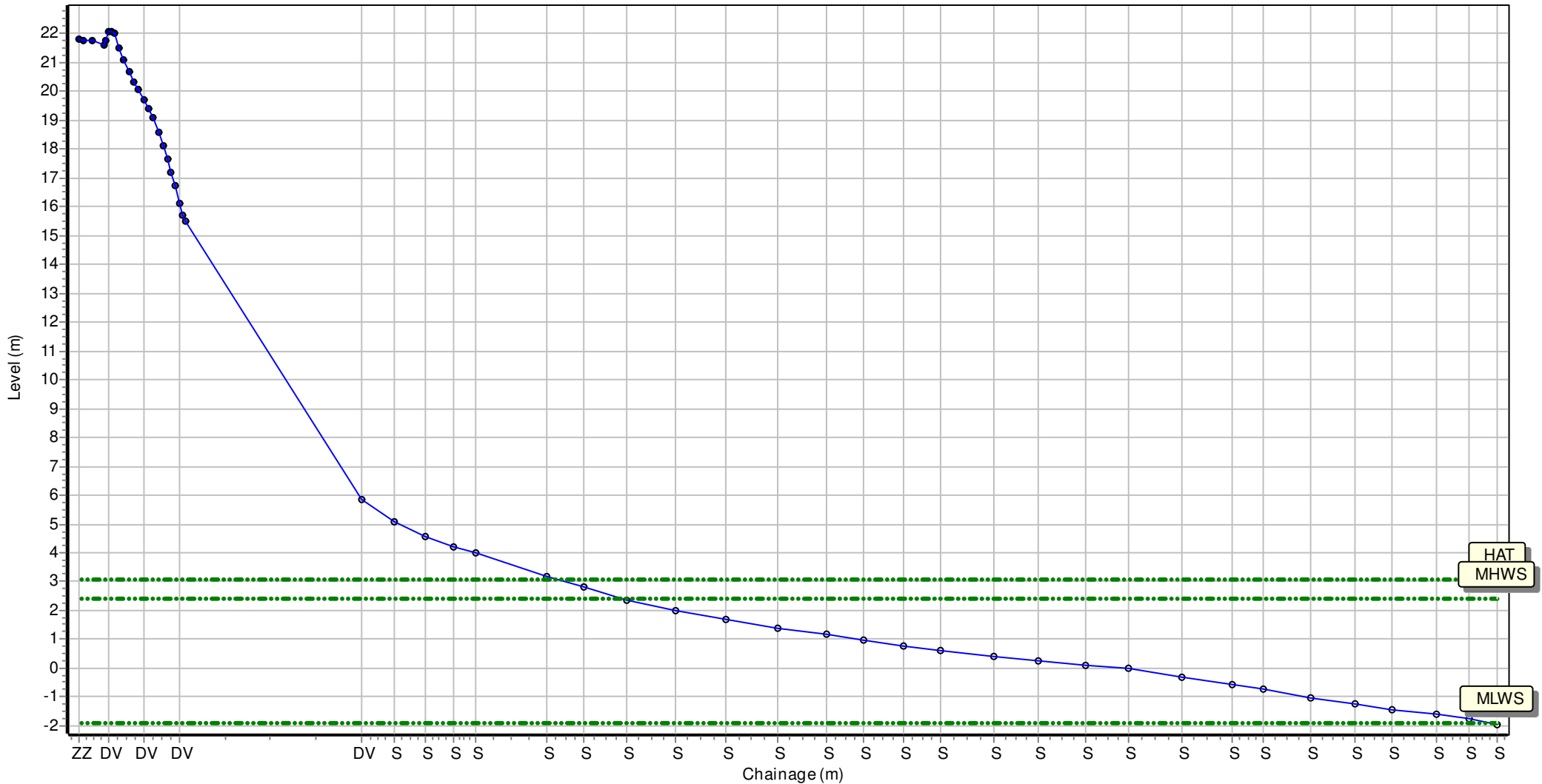
Sea State:

Visibility:

Rain:

Summary: 2021 Partial Measures Topo Survey

Easting: 436742.221 Northing: 570082.97 Profile Bearing: 74 ° from North



# Beach Profile

Location: 1aNTDC08

Date: 01/03/2021

Inspector: AG

Low Tide:

Low Tide Time:

Wind

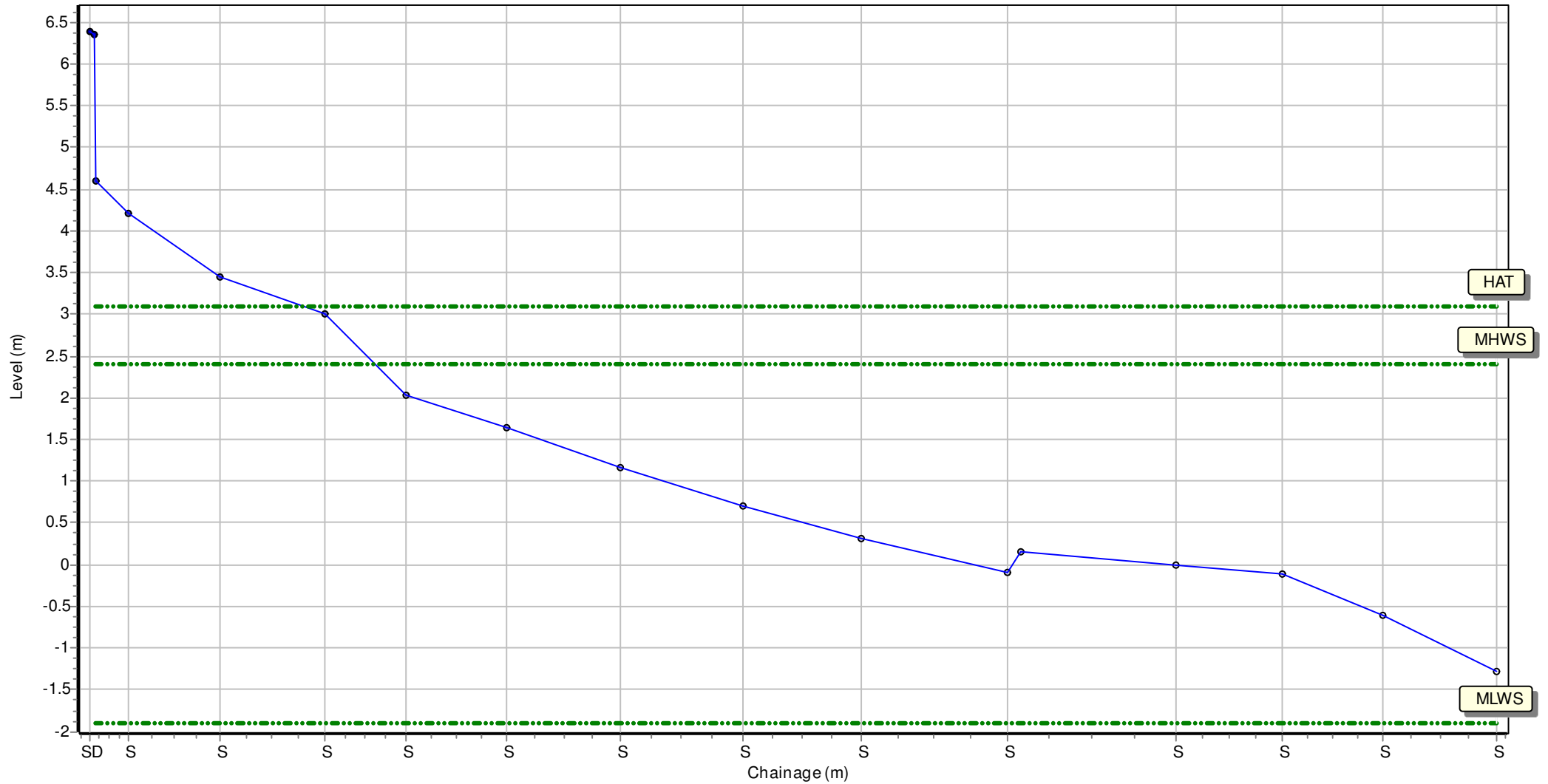
Sea State:

Visibility:

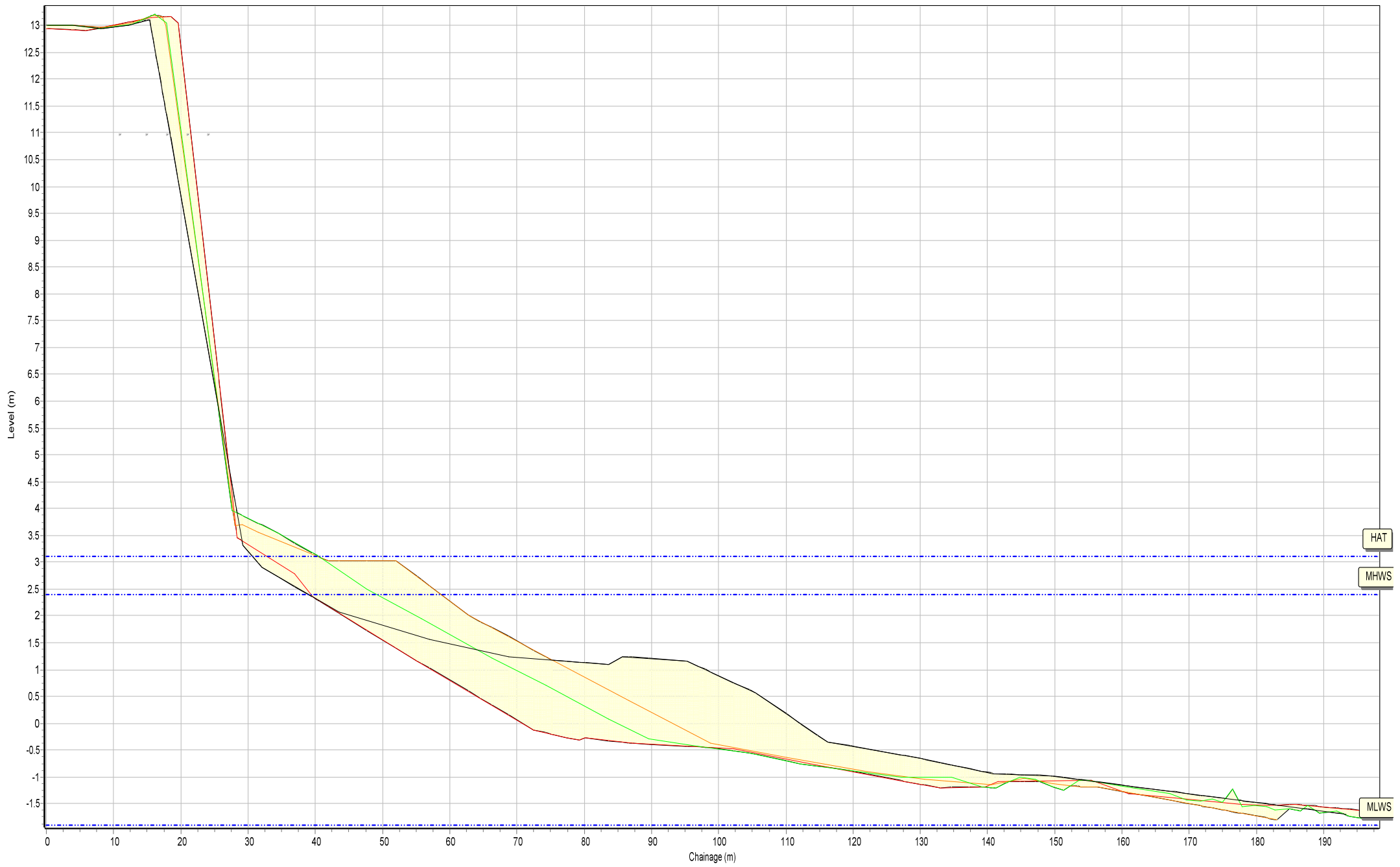
Rain:

Summary: 2021 Partial Measures Topo Survey

Easting: 437142.187 Northing: 569510.828 Profile Bearing: 67 ° from North



Beach Profiles: 1aNTDC01



Profiles Envelope 14/05/2002 10/03/2020 21/09/2020 04/03/2021

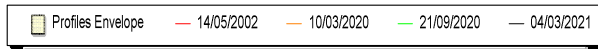
HAT

MHWS

MLWS

SANDS

Beach Profiles: 1aNTDC02



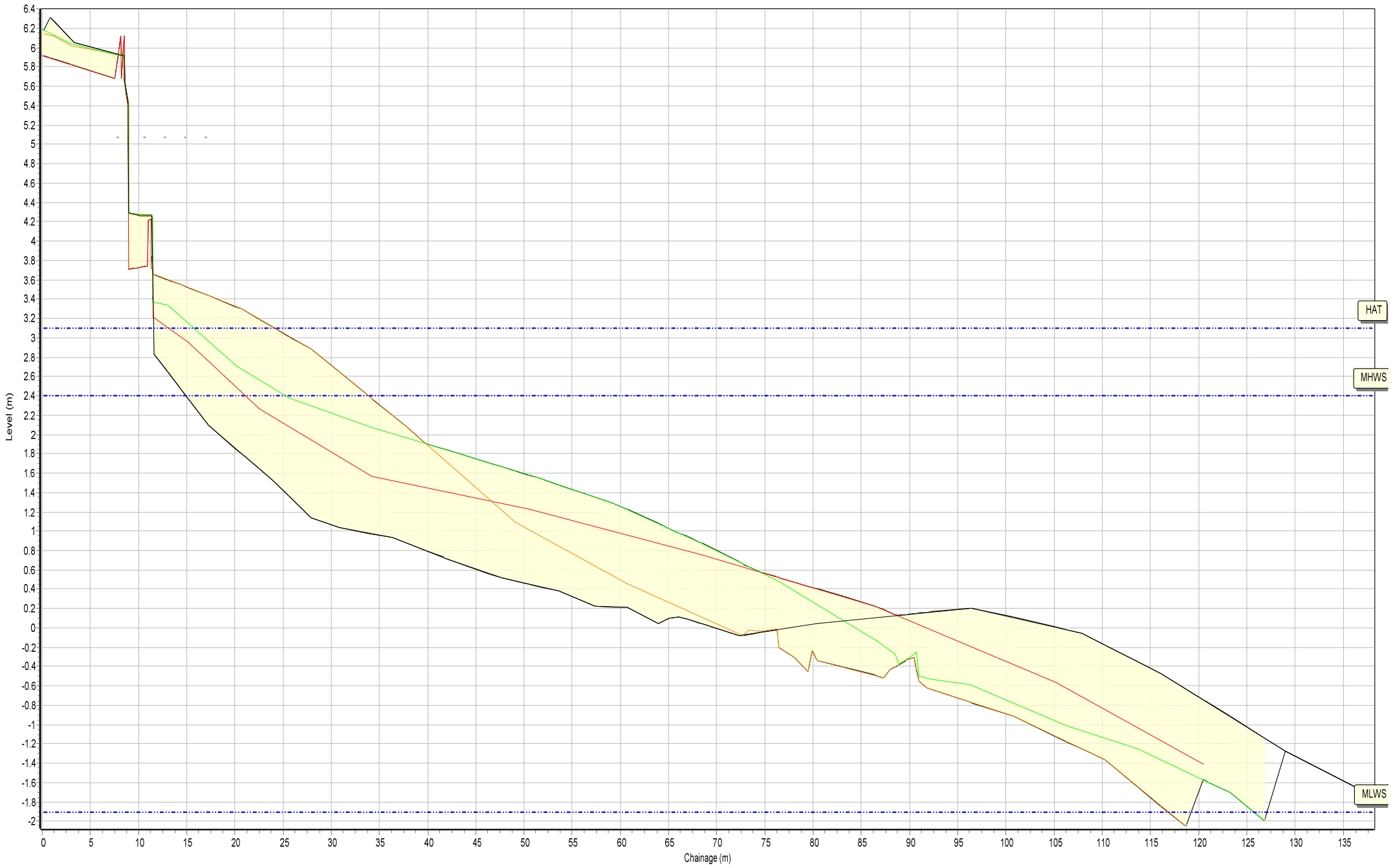
HAT

MHWS

MLWS

SANDS

Beach Profiles: 1aNTDC03





Beach Profiles: 1aNTDC04



HAT

MHWS

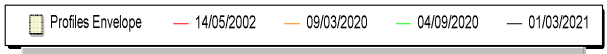
MLWS

SANDS

Beach Profiles: 1aNTDC04A



# Beach Profiles: 1aNTDC05



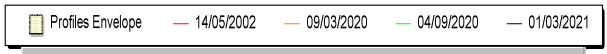
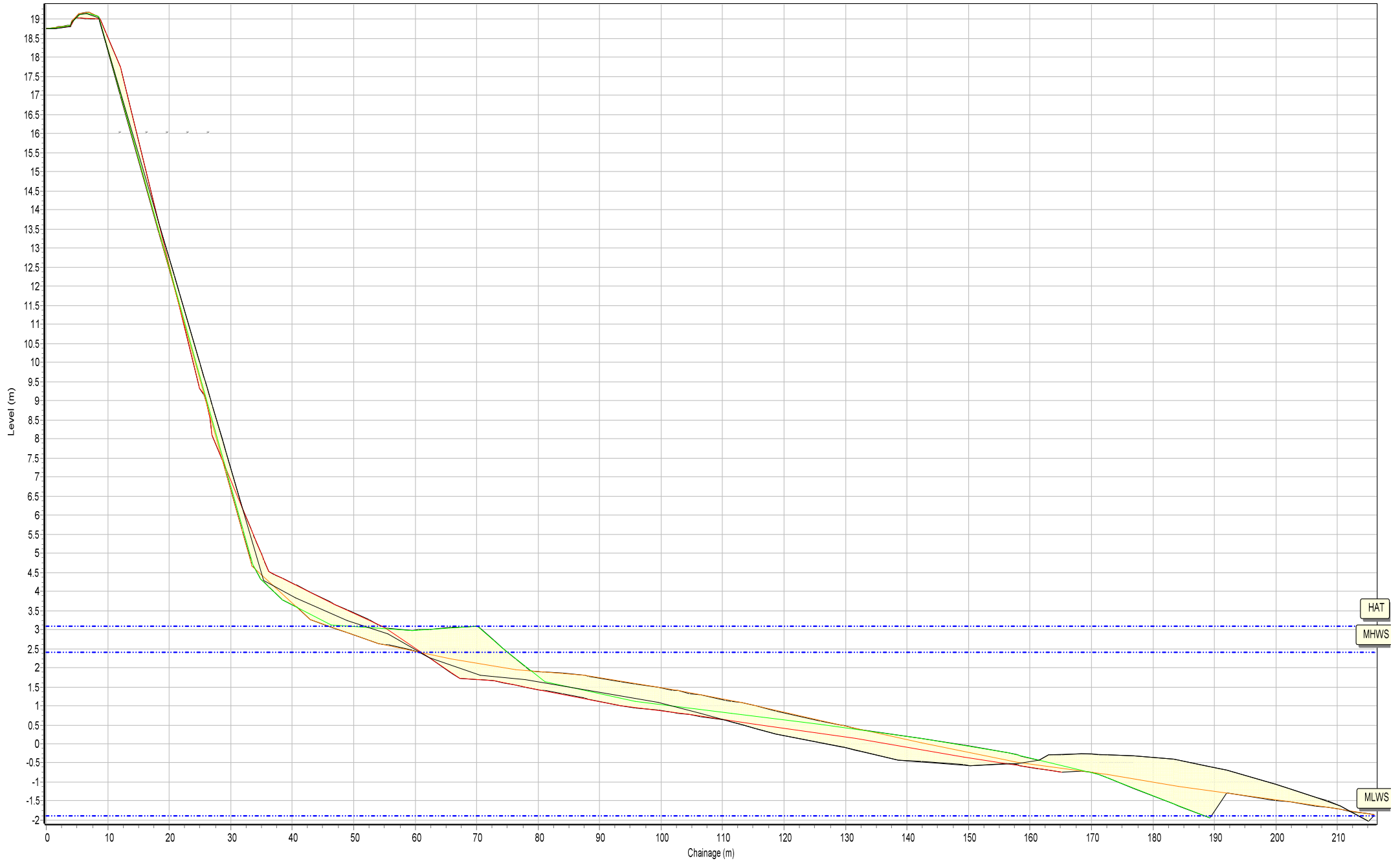
HAT

MHWS

MLWS

SANDS

Beach Profiles: 1aNTDC06



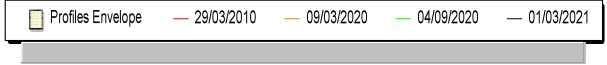
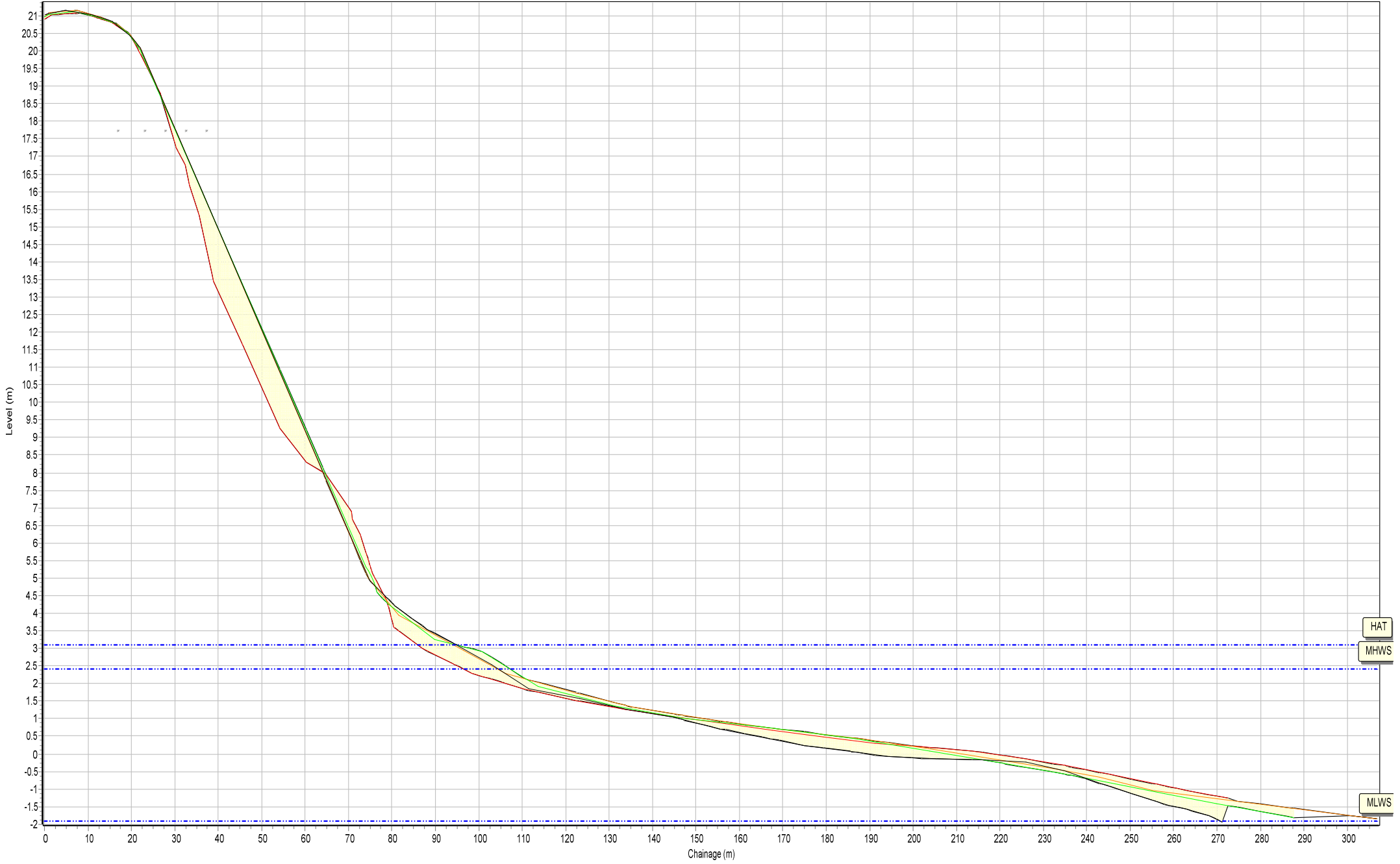
HAT

MHWS

MLWS

SANDS

# Beach Profiles: 1aNTDC06A



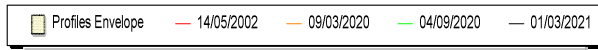
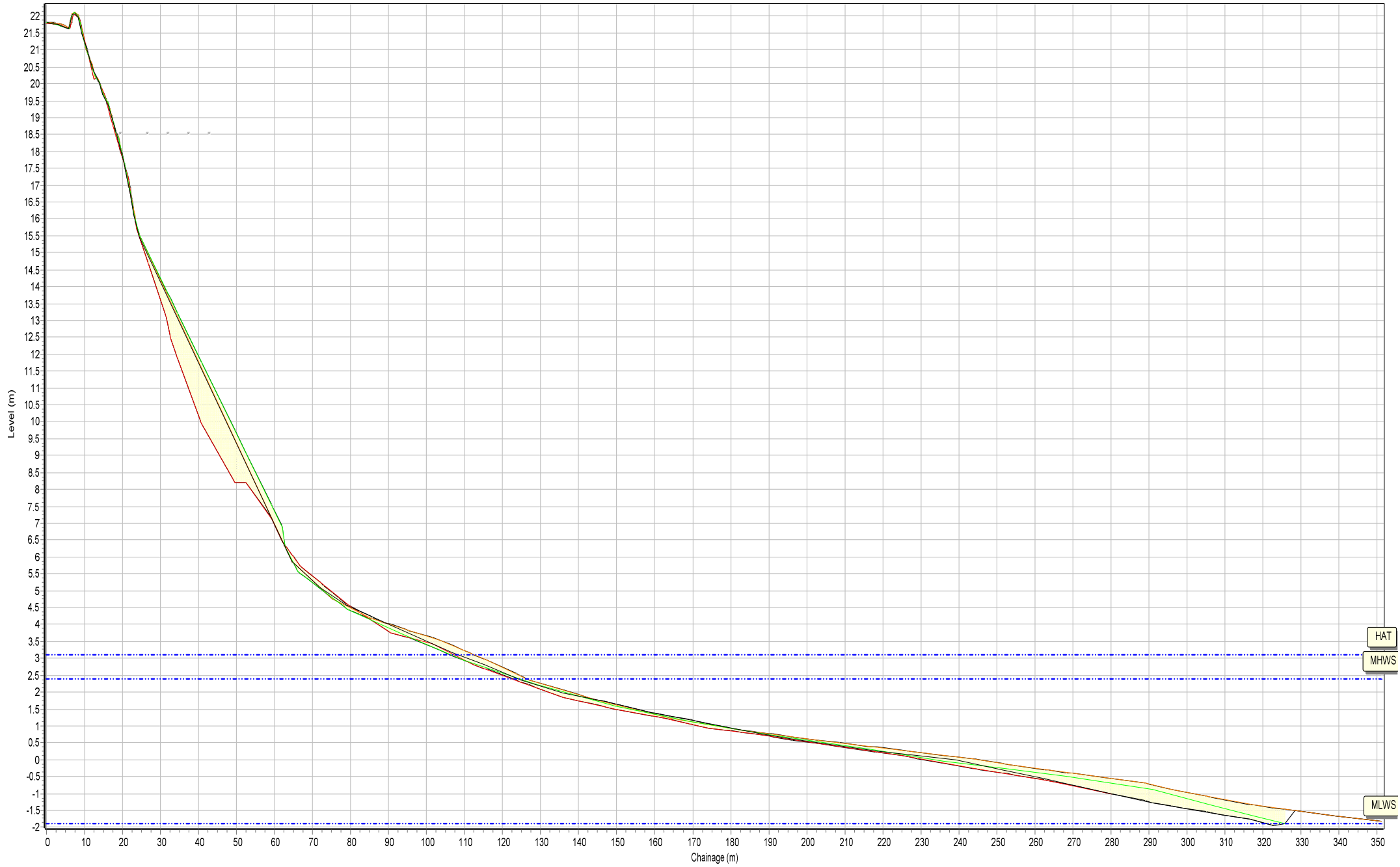
HAT

MHWS

MLWS

SANDS

Beach Profiles: 1aNTDC07



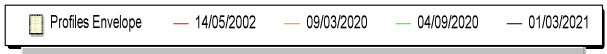
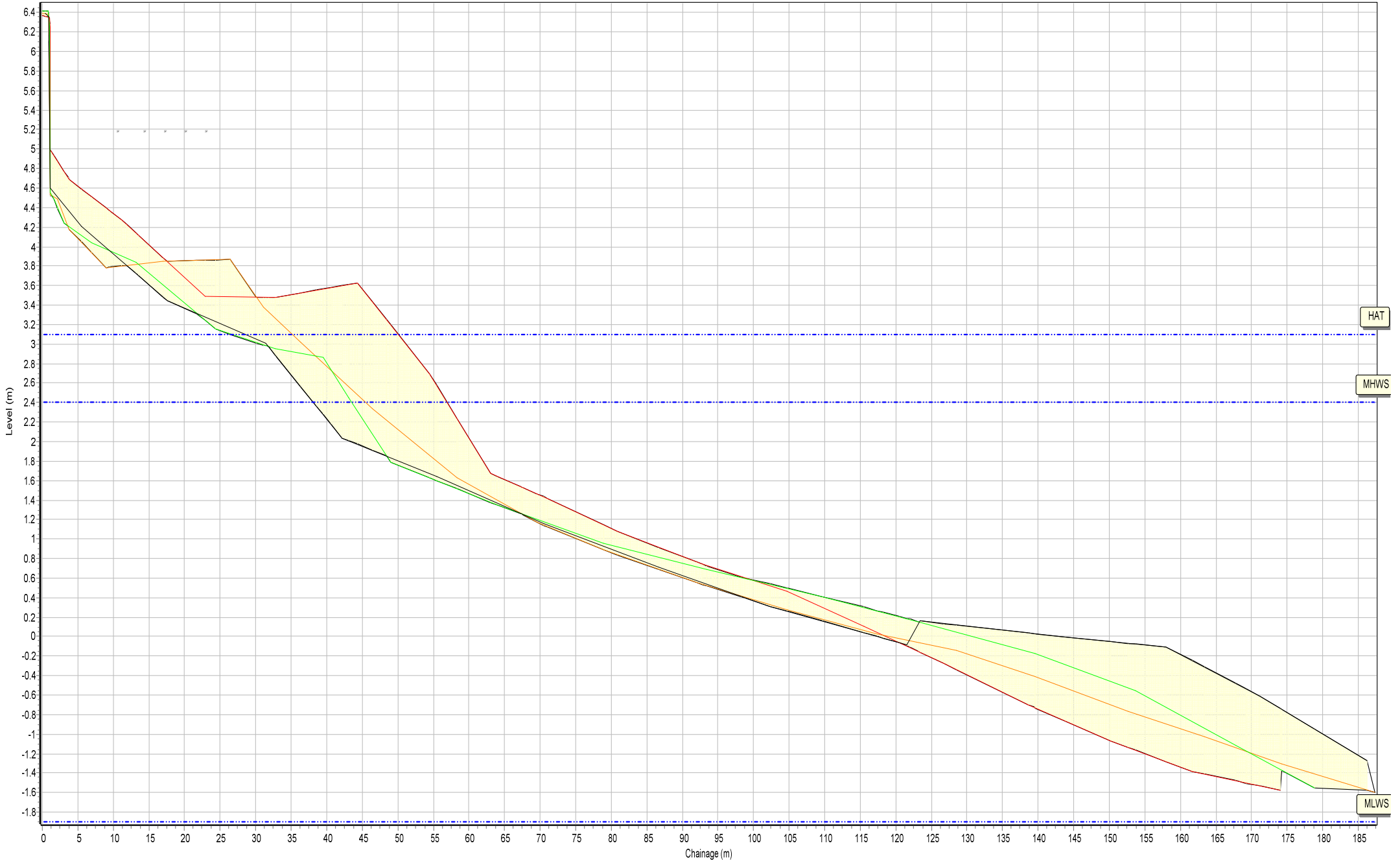
HAT

MHWS

MLWS

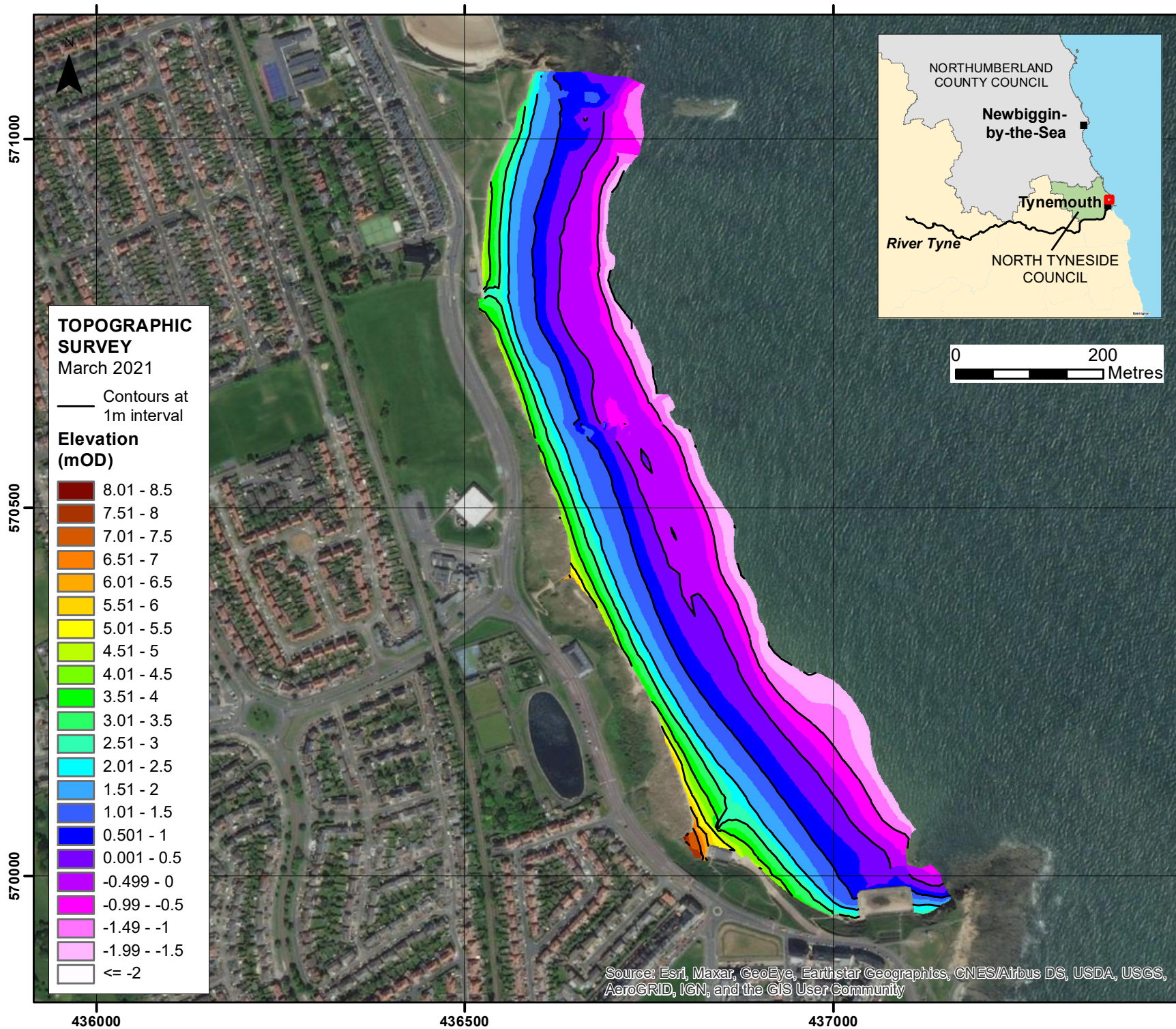
SANDS

Beach Profiles: 1aNTDC08



**Appendix B**  
**Topographic Survey**





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

**Appendix B - Map 1**

**LONGSANDS**

**North Tyneside Council Frontage**

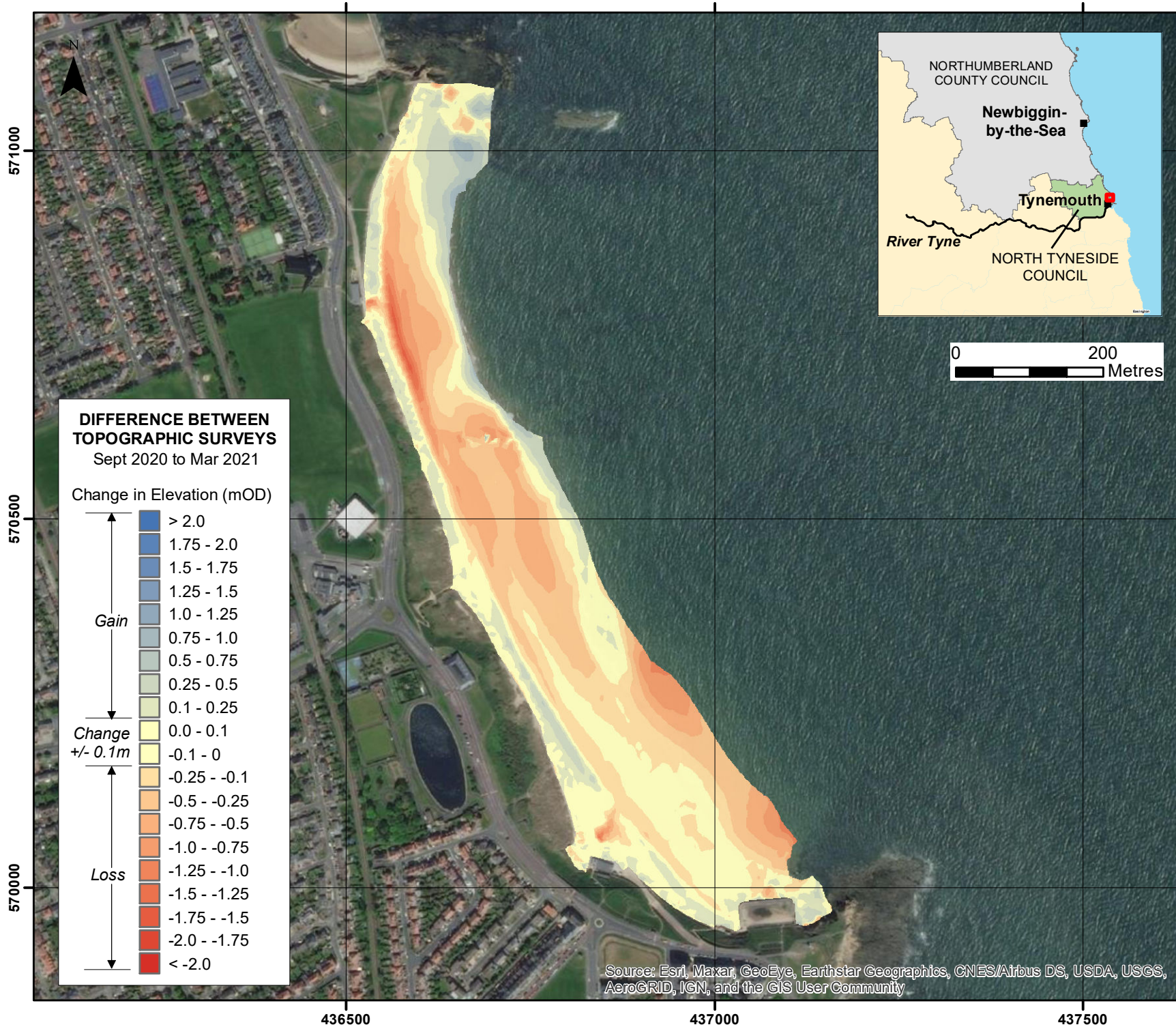
Update Report  
'Partial Measures' Survey 2021

Drawing Scale at A4 1:7,000

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NORTHUMBERLAND COUNTY COUNCIL  
Newbiggin-by-the-Sea  
Tynemouth  
River Tyne  
NORTH TYNESIDE COUNCIL

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

**Appendix B - Map 2**  
**LONGSANDS**  
**North Tyneside Council Frontage**  
Update Report  
'Partial Measures' Survey 2021  
Drawing Scale at A4 1:7,000

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