

## **Cell 1 Regional Coastal Monitoring Programme Update Report 11: 'Partial Measures' Survey 2019**

## Contents

Disclaimer .....	i
Abbreviations and Acronyms.....	ii
Water Levels Used in Interpretation of Changes .....	ii
Glossary of Terms.....	iii
Preamble .....	iv
1. Introduction.....	1
1.1 Study Area .....	1
1.2 Methodology.....	1
2. Analysis of Survey Data .....	3
2.1 Whitley Sands .....	3
2.2 Cullercoats Bay .....	5
2.3 Tynemouth Long Sands .....	6
2.4 King Edward’s Bay .....	8
3. Problems Encountered and Uncertainty Analysis.....	9
4. Recommendations for ‘Fine-tuning’ the Monitoring Programme .....	9
5. Conclusions and Areas of Concern .....	9

## Appendices

Appendix A	Beach Profiles
Appendix B	Topographic Survey

## List of Figures

Figure 1	Sediment Cells in England and Wales
Figure 2	Survey Locations

## List of Tables

Table 1	Analytical, Update and Overview Reports Produced to Date
Table 2	Sub-division of the Cell 1 Coastline

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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

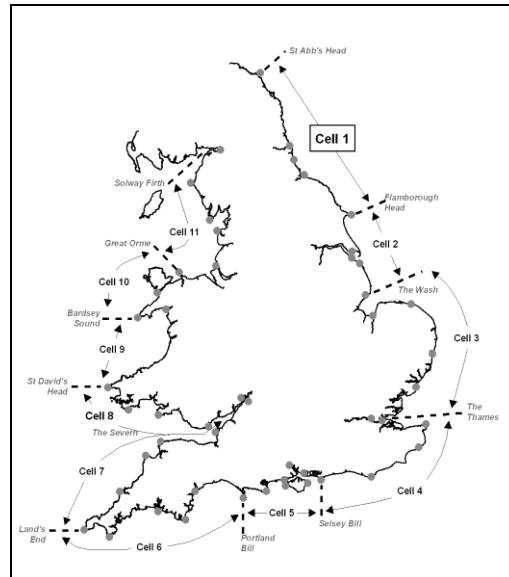
**Source:** *Scottish Border to River Tyne Shoreline Management Plan 2.*  
Royal Haskoning, May 2009.

## 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
- walk-over 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 (*)	

(\*) The present report is **Update Report 11** and provides an analysis of the 2019 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)

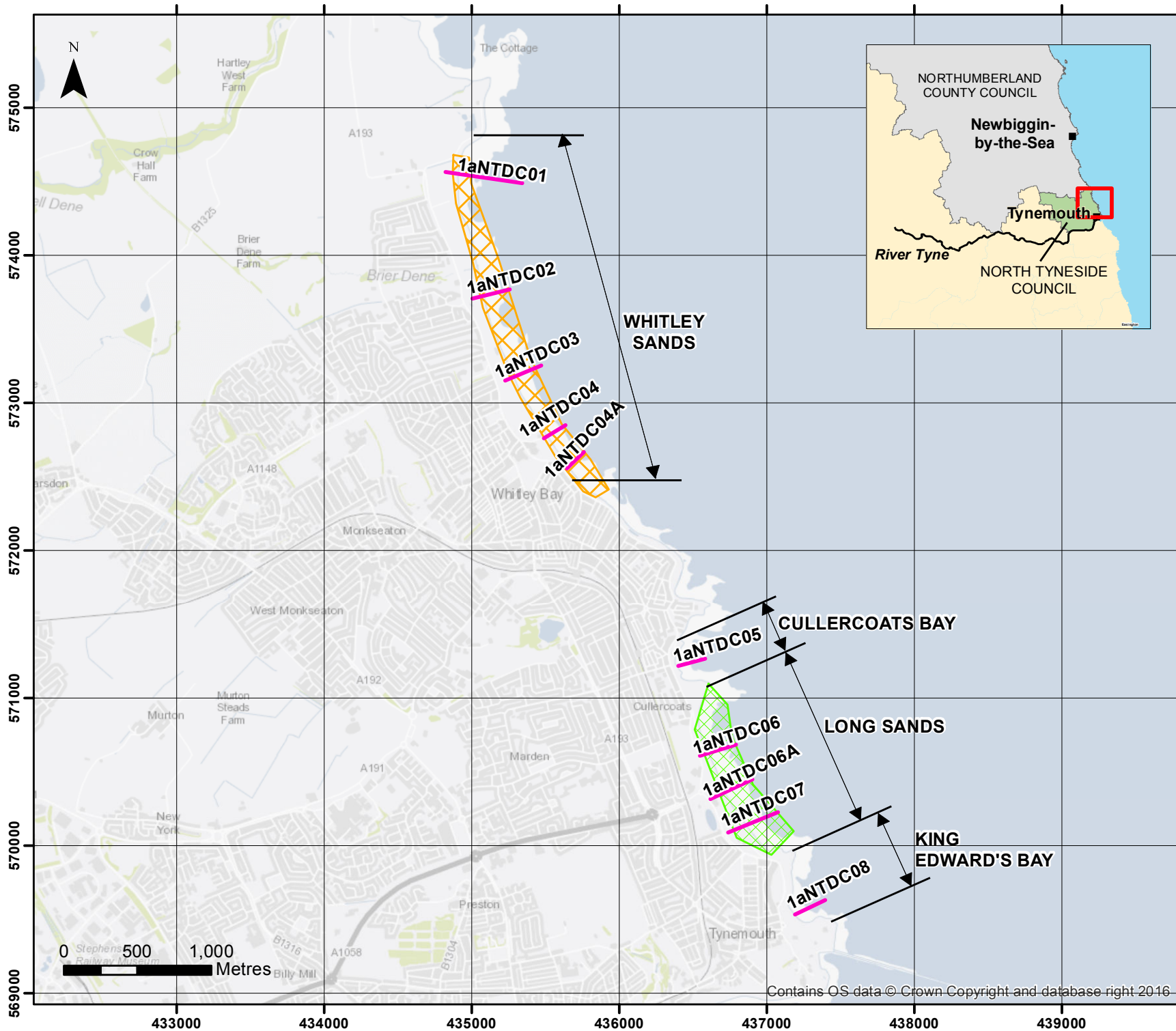
The location of these surveys is shown in Figure 2. The Partial Measures 2019 surveys were undertaken along this frontage on the 18<sup>th</sup>-19<sup>th</sup> February and 8<sup>th</sup> March 2019. During this time weather conditions varied; refer to the survey reports for details of the weather conditions 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
<p><b>18<sup>th</sup> – 19<sup>th</sup> Feb 2019</b></p>	<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 2018 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. The profile shows no change in the position of the cliff since the previous survey. There has been an accretion of up to 0.5m at the toe of the cliff, whilst the berm on the upper beach has eroded by up to 0.7m. The rest of the beach profile shows little change limited to <math>\pm 0.3</math>m. Overall the profile is at a medium-low level compared to the range recorded from previous surveys, with the middle beach being particularly low.</p> <p>Profile <b>1aNTDC02</b> is located towards the north of Whitley Sands. From the sea wall as far as 104m chainage the elevation of the beach has increased by up to 0.9m compared to the previous survey. From chainage 104m to the end of the survey the beach levels have decreased by up to 0.8m. A small berm has formed at chainage 76m. Rocks have been uncovered further landward at chainage 128m. The upper beach is at a relatively high level compared to the range recorded from previous surveys. The lower beach is at a relatively low level.</p> <p>Profile <b>1aNTDC03</b> is located at the centre of Whitley Sands. Beach levels have dropped between the sea wall and the rocky outcrop at 74m chainage, with the maximum decrease being the erosion of a berm on the upper beach by up to 0.45m. There has been small amounts of accretion between rocks seaward of chainage 74m. The upper beach is at a high level compared to the previous surveys, however the lower beach is now at a low level.</p>	<p>Since the last survey, beach levels at Whitley Sands beach levels have varied, with erosion dominating across the profiles in the north and centre of the bay. The south of the bay shows accretion across the middle and lower beach with erosion on the upper beach.</p> <p><b>Longer term trends:</b></p> <p>The data show that profiles are mostly within the bounds of previous surveys.</p>

Survey Date	Description of Changes Since Last Survey	Interpretation
	<p>Profile <b>1aNDC04</b> is located to the south of Whitley Sands. There has been erosion of up to 0.4m on the upper beach from the base of the seawall up to chainage 45m. Seawards of chainage 45m the beach levels have increased by 1.0m compared to the previous survey, which has flattened the overall profile. Overall the upper beach is at a medium to high level and the lower beach is at a medium level compared to the range recorded from previous surveys.</p> <p>Profile <b>1aNTDC04a</b> is located to the south of Whitley Sands. A small section of the upper beach has fallen by up to 0.2m to chainage 12m. Seawards of chainage 12m there has been accretion of up to 0.3m, covering the previously exposed rocky shore platform between chainages 53m to 72m. Seaward of 72m, the rock shore platform is exposed. The upper beach is relatively medium compared to the range recorded from previous surveys whilst the lower beach is at a low level.</p>	

## 2.2 Cullercoats Bay

Survey Date	Description of Changes Since Last Survey	Interpretation
18 <sup>th</sup> Feb 2019	<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 2018 Full Measures survey.</p> <p>The cliff top position along <b>1aNTDC05</b> has remained constant since surveys began in April 2002, but there have been apparent changes on the cliff face. According to the survey report, the cliff was not measured due to dangerous access. There has been slight erosion of 0.1m between the cliff toe and chainage 26m. Between chainage 26m and 66m there has been negligible accretion / erosion limited to <math>\pm 0.1</math>m. Between chainages 66m and 98m there has been erosion of a middle beach berm by up to 0.6m. Seawards of chainage 98m there has been accretion of up to 0.7m. Overall the beach is at a low level on the upper and middle beach, and at a medium- high level on the lower beach compared to the range recorded from previous surveys.</p>	<p>There has been some winter draw down of material from the middle to lower beach.</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
8 <sup>th</sup> March 2019	<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 2018 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 41m of up to 0.25m. Seawards of chainage 41m there has been accretion of up to 0.7m on the upper and middle beach and up to 0.5m on the lower beach, smoothing out the profile. Overall the profile is at a medium-high level compared to the range recorded from previous surveys, with the toe of the beach being the highest on record.</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>’. There has been limited change across the upper and middle beach profile, up to ±0.2m. Seaward of 190m there has been erosion of up to 0.4m. Overall the profile is at medium-low 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 has seen very little change of ±0.2m from the toe of the dunes to chainage 275m. A small berm has formed at chainage 300m.. Overall the beach is at a medium level compared to the range recorded from previous surveys, whilst</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 and generally showing erosion of berms and creation of smoother concave profiles.</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
	the toe of the beach between chainages 300m to 346m is at its highest level recorded,	
8 <sup>th</sup> March 2019	<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 (October 2017).</p> <p>The difference plot shows that accretion has dominated the upper and middle beach of the northern half of the bay, whilst erosion has dominated on the lower beach. In the central and southern areas of the bay, there is limited erosion on the upper beach and across the middle beach, with small patches of accretion on the lower beach. Overall, change is limited to <math>\pm 0.75\text{m}</math>.</p>	<p>Since the last survey, the beach at Tynemouth Long Sands has been dominated by accretion in the north of the bay and little change / small scale erosion in the south of the bay.</p>

## 2.4 King Edward's Bay

Survey Date	Description of Changes Since Last Survey	Interpretation
8 <sup>th</sup> March 2019	<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 2018 Full Measures survey.</p> <p>At profile <b>1aNTDC08</b> there has been movement of the upper beach berm further seaward by 6m. Between chainages 60m and 145m there has been erosion of 0.2m. Seawards of chainage 145m however there has been accretion of up to 0.25m at the toe of the beach. The beach is at a low level compared to the range recorded from previous surveys, particularly between chainage 56m and 120m which is at the lowest level on record.</p>	<p>Since the last survey, the beach at King Edward's Bay beach has seen little change, except the movement of an upper beach berm seaward by 6m.</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 profile 1aNTDC03 the construction which was ongoing on the promenade during previous surveys restricting access to the start of the section was complete. The profile now shows the new promenade profile.
- At profile 1aNTDC05 the cliff was not measured due to dangerous access. Access to this profile is noted to have been dangerous in the previous Partial Measures and Full Measures reports, and it is therefore recommended that the beach profile data should start at the cliff toe and the cliff position should 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**

- N/A

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

It is recommended that access to the stabilised dunes at Tynemouth Long Sands be attempted in future surveys in order to monitor the effectiveness of the stabilisation fences.

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

- At Whitley Sands, beach levels have generally shown decreases in the north of the bay and on the upper beach in the south of the bay, with increases on the middle and lower beach, suggesting drawdown. For the most part, the beach is at a medium level or lower in the north of the bay, whilst beach levels in the south of the bay were at mostly medium to medium high levels. 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 some drawdown of material from the middle to lower beach but there are no causes for concern.
- At Tynemouth Long Sands, the dune-cliff face was not surveyed due to access constraints, and beach profile change has been relatively small generally showing erosion of berms and the creation of smoother concave profiles. The topographic survey is dominated by accretion in the north of the bay and erosion in the south. Overall the beach is at a medium level compared to the range recorded from previous surveys, however the toe of the beach at profile 1aNTDC06 is the highest on record.
- At King Edward's Bay, the upper beach berm has moved seaward by 6m, with change across the rest of the beach limited to  $\pm 0.25$ m. The middle beach between 56m and 120m is currently at its lowest level on record, this should be monitored in the next survey to check for signs of recovery or further erosion.



## **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: 19/02/2019

Inspector: AG

Low Tide:

Low Tide Time:

Wind

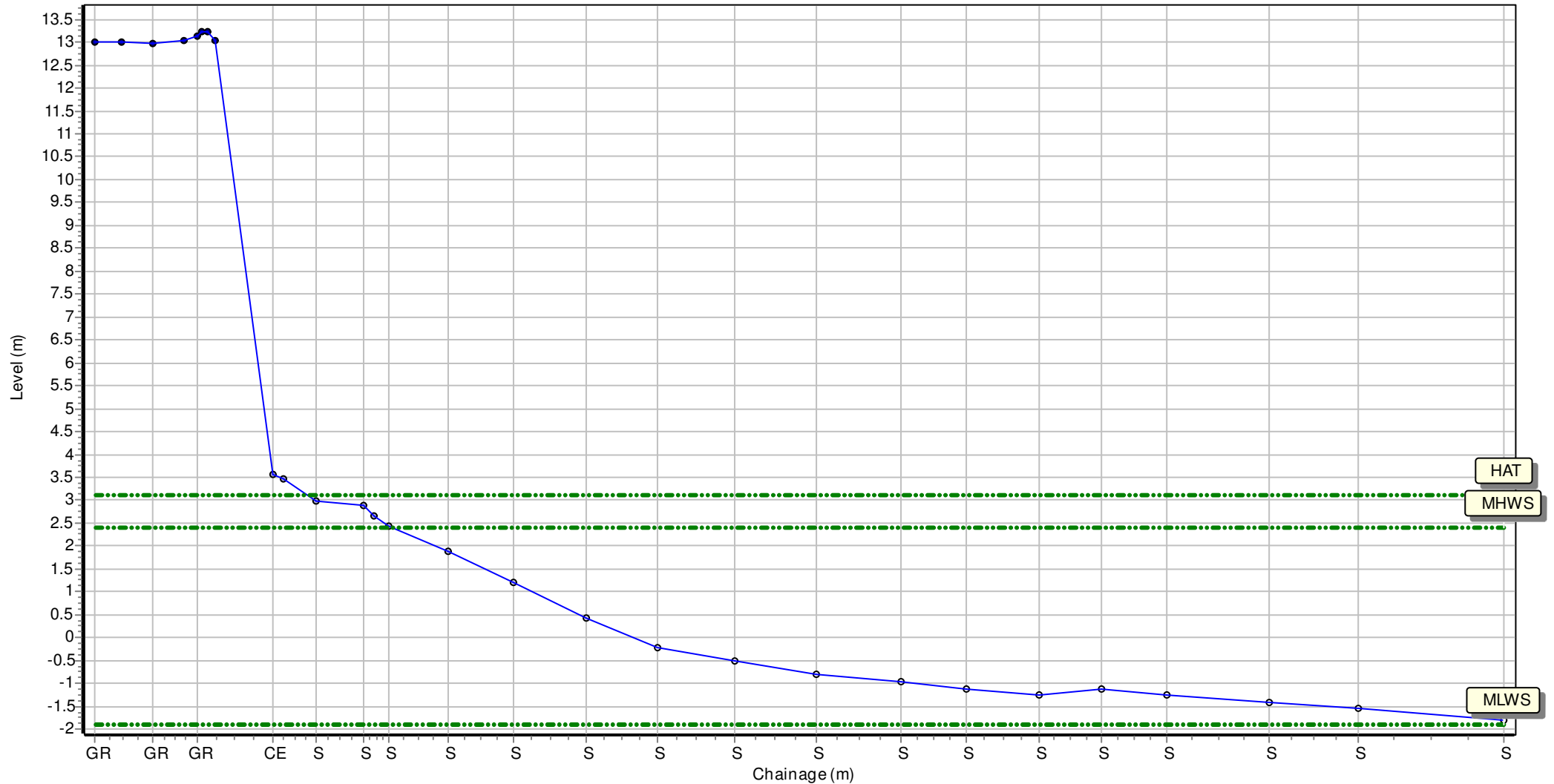
Sea State:

Visibility:

Rain:

Summary: 2019 Partial Measures Topo Survey

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



# Beach Profile

Location: 1aNTDC02

Date: 19/02/2019

Inspector: AG

Low Tide:

Low Tide Time:

Wind

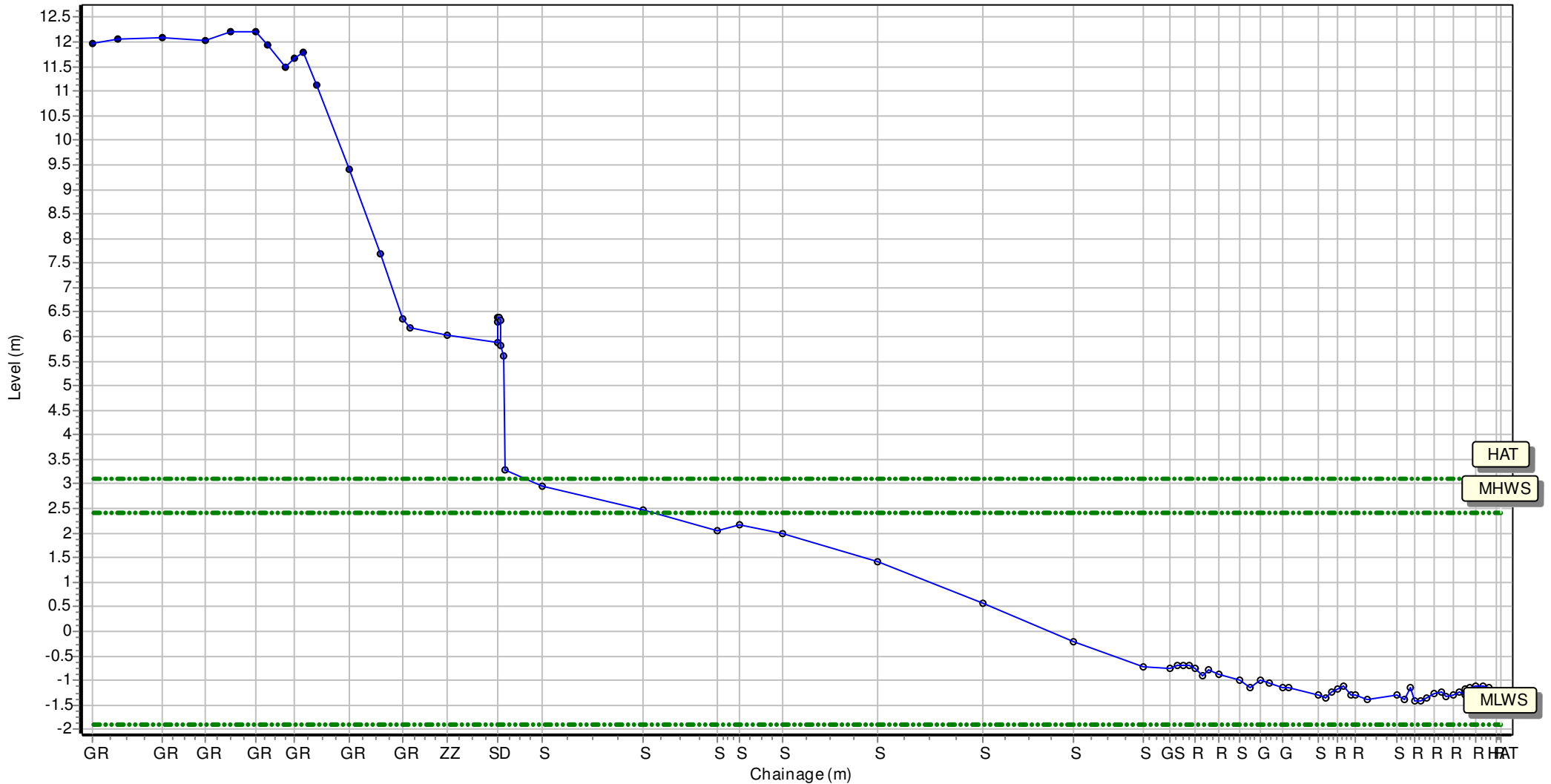
Sea State:

Visibility:

Rain:

Summary: 2019 Partial Measures Topo Survey

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



# Beach Profile

Location: 1aNTDC03

Date: 19/02/2019

Inspector: AG

Low Tide:

Low Tide Time:

Wind

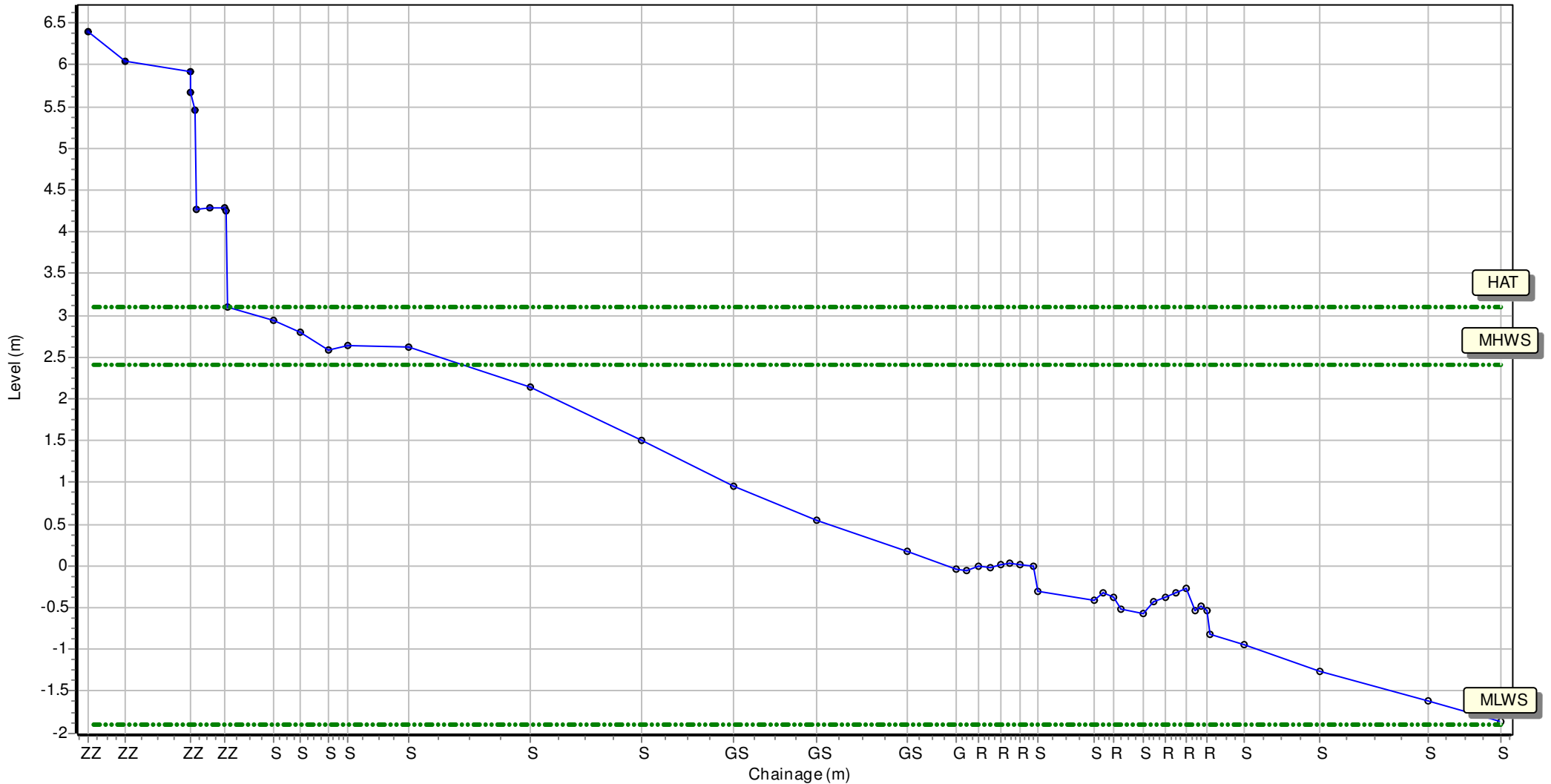
Sea State:

Visibility:

Rain:

Summary: 2019 Partial Measures Topo Survey

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



# Beach Profile

Location: 1aNTDC04

Date: 19/02/2019

Inspector: AG

Low Tide:

Low Tide Time:

Wind

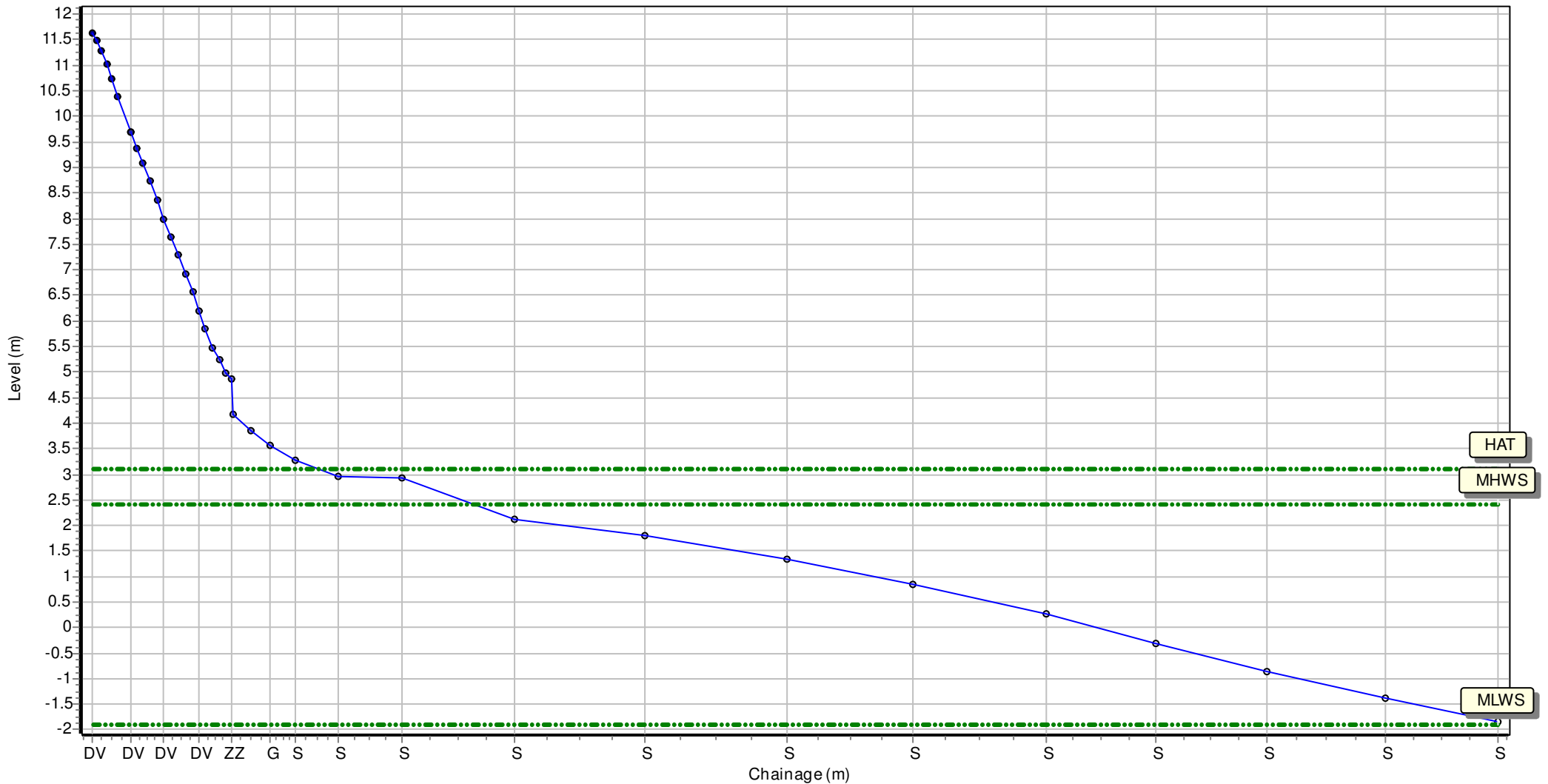
Sea State:

Visibility:

Rain:

Summary: 2019 Partial Measures Topo Survey

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



# Beach Profile

Location: 1aNTDC04A

Date: 19/02/2019 Inspector: AG

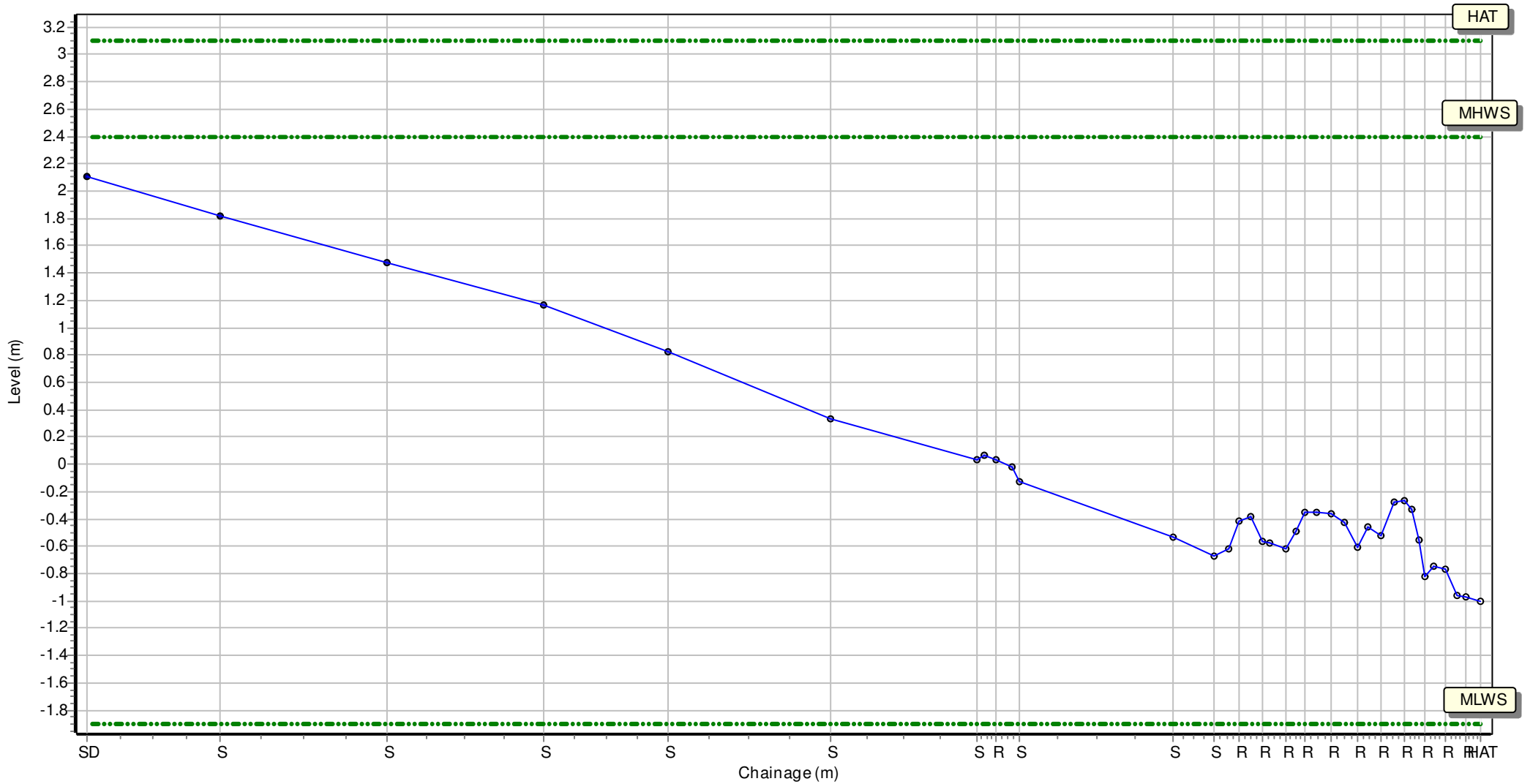
Low Tide: Low Tide Time:

Wind Sea State:

Visibility: Rain:

Summary: 2019 Partial Measures Topo Survey

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





# Beach Profile

Location: 1aNTDC05

Date: 18/02/2019

Inspector: AG

Low Tide:

Low Tide Time:

Wind

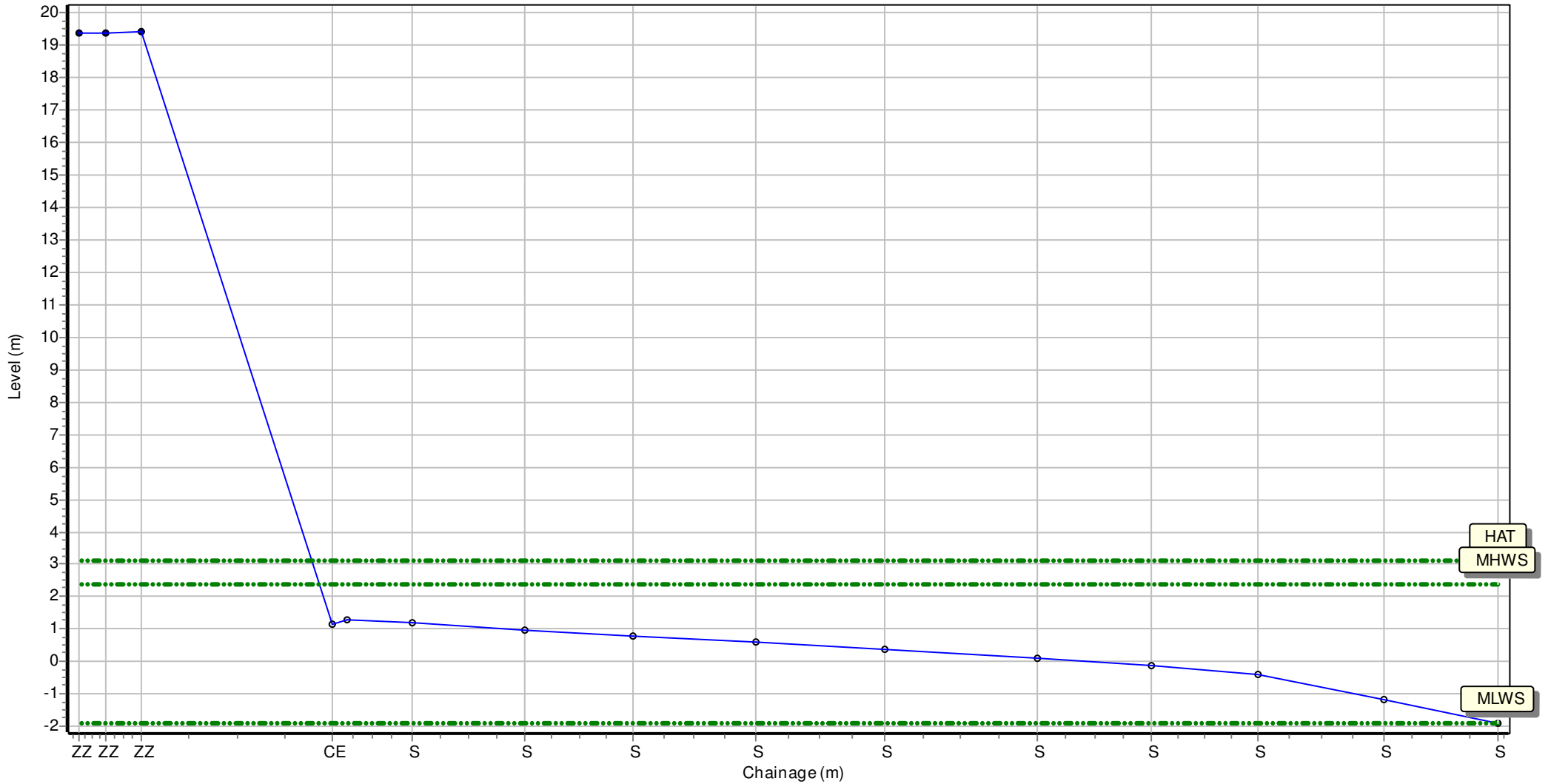
Sea State:

Visibility:

Rain:

Summary: 2019 Partial Measures Topo Survey

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



# Beach Profile

Location: 1aNTDC06

Date: 18/02/2019

Inspector: AG

Low Tide:

Low Tide Time:

Wind

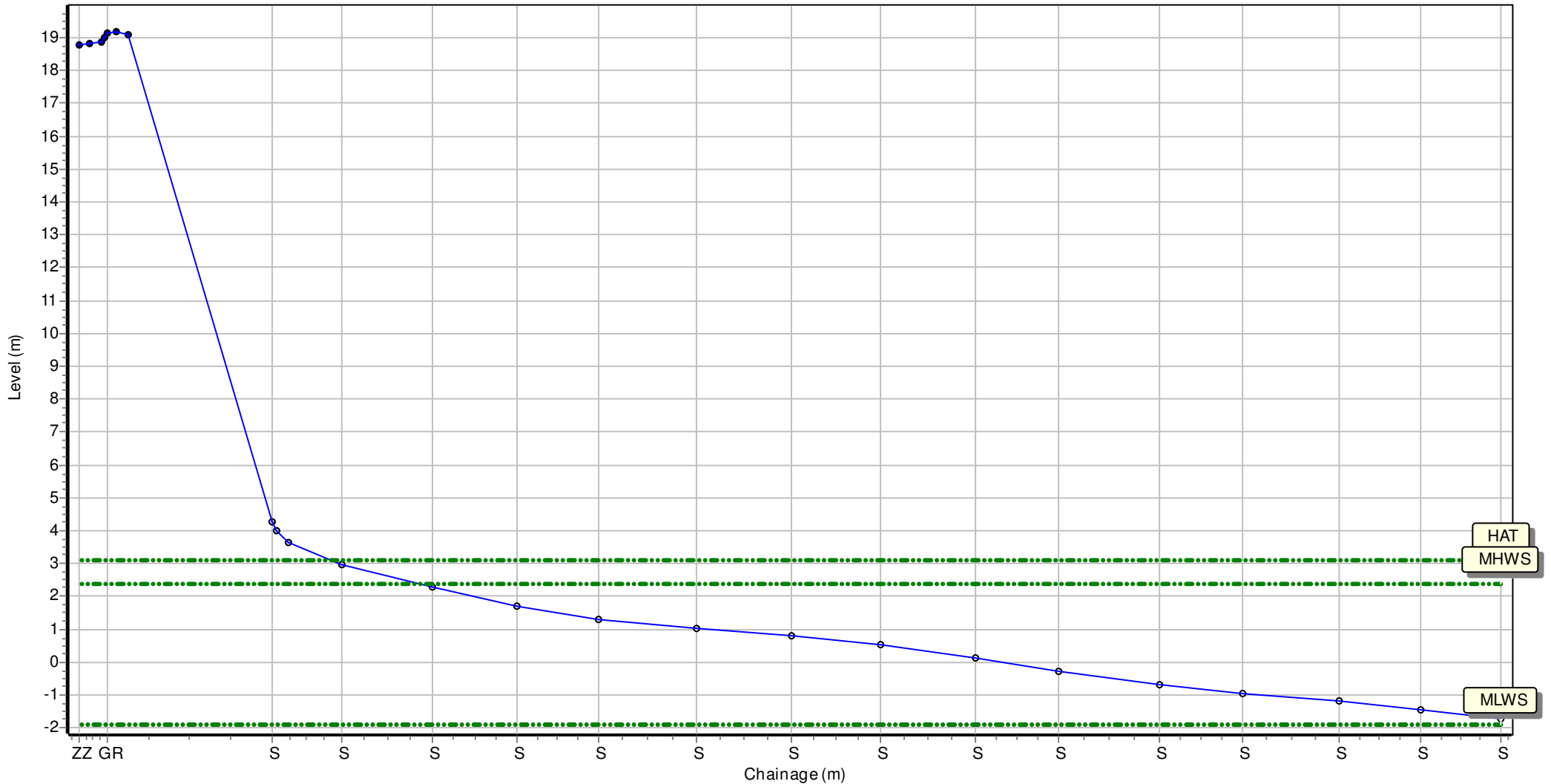
Sea State:

Visibility:

Rain:

Summary: 2019 Partial Measures Topo Survey

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



# Beach Profile

Location: 1aNTDC06A

Date: 18/02/2019 Inspector: AG

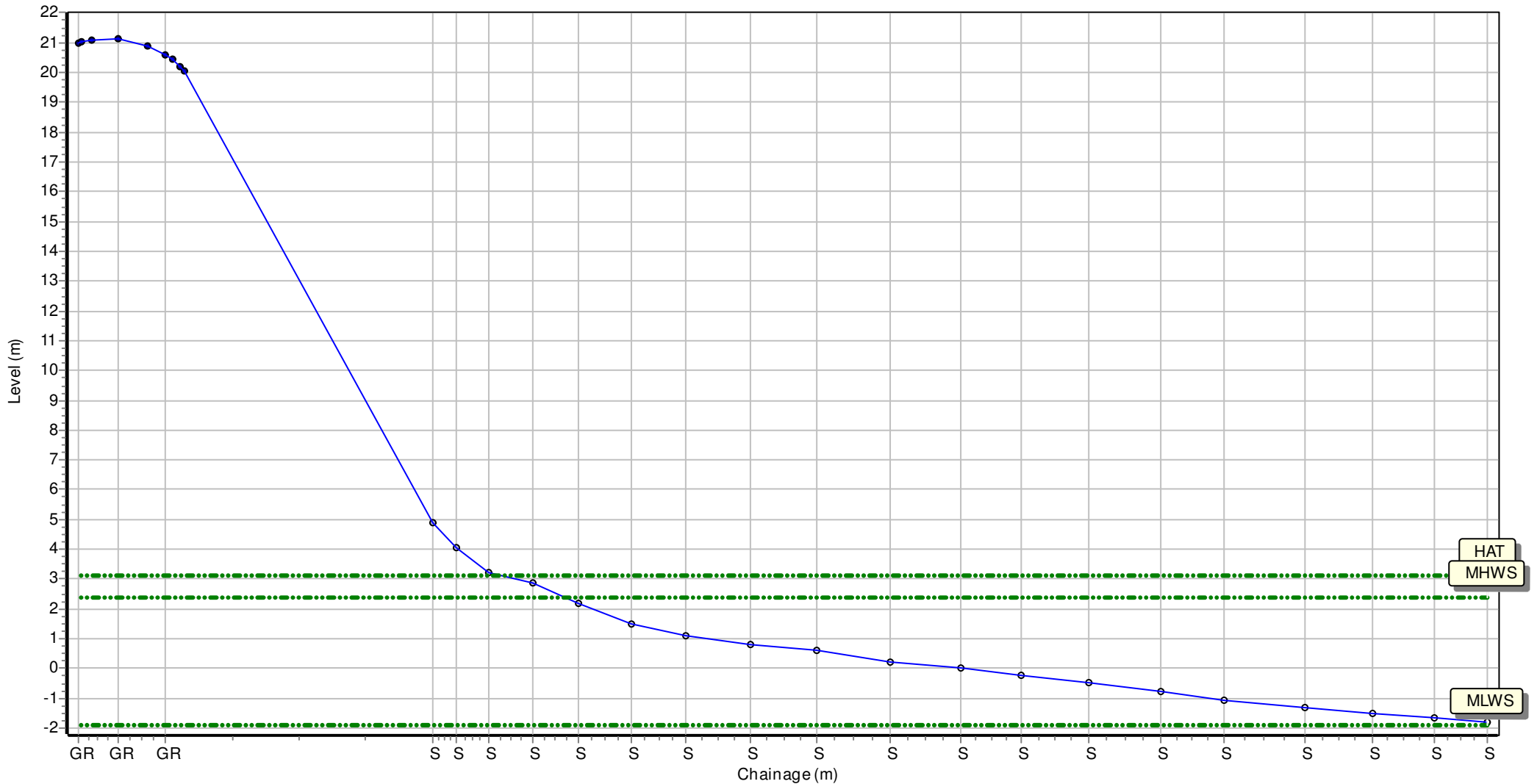
Low Tide: Low Tide Time:

Wind Sea State:

Visibility: Rain:

Summary: 2019 Partial Measures Topo Survey

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



# Beach Profile

Location: 1aNTDC07

Date: 18/02/2019

Inspector: AG

Low Tide:

Low Tide Time:

Wind

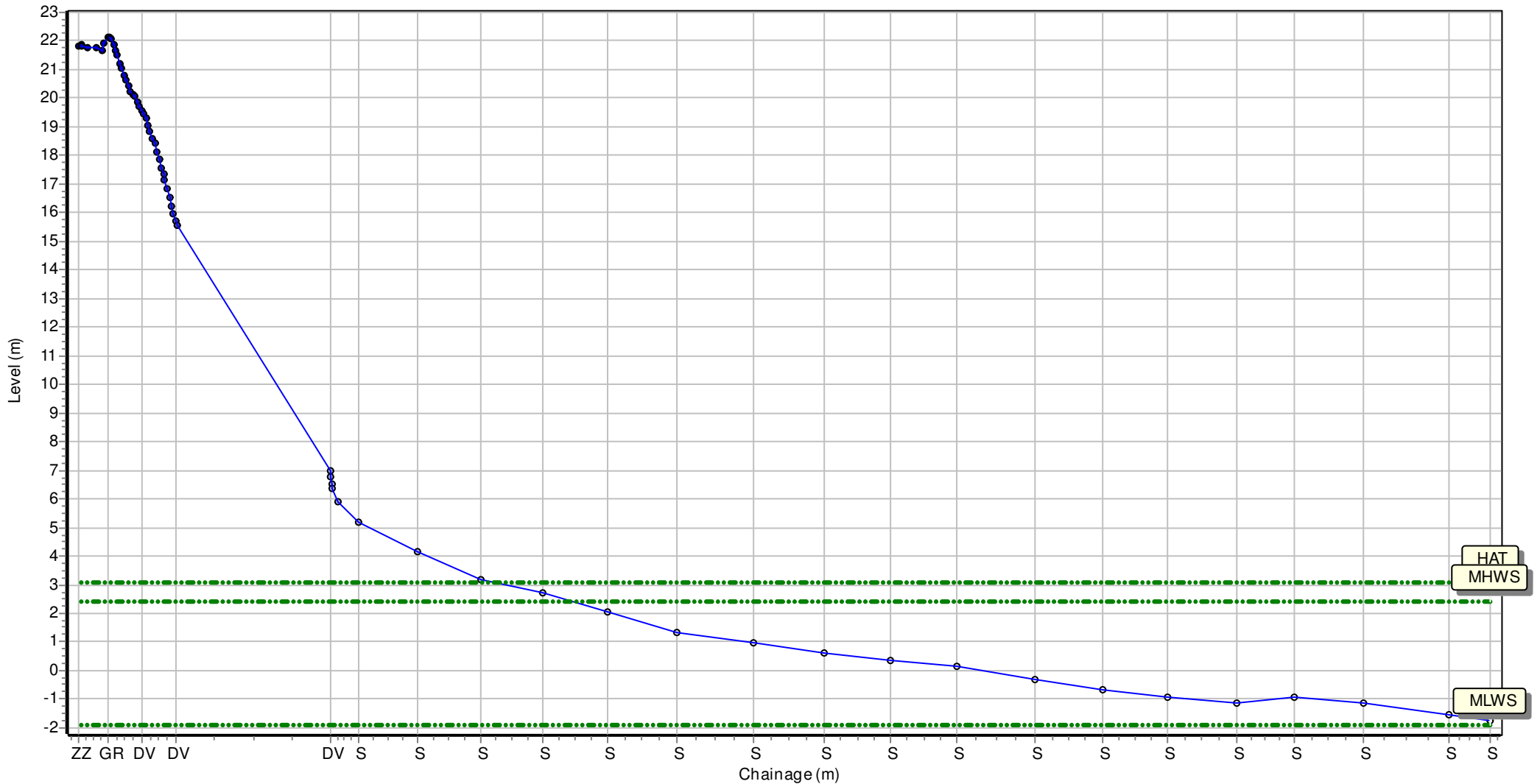
Sea State:

Visibility:

Rain:

Summary: 2019 Partial Measures Topo Survey

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



# Beach Profile

Location: 1aNTDC08

Date: 18/02/2019

Inspector: AG

Low Tide:

Low Tide Time:

Wind

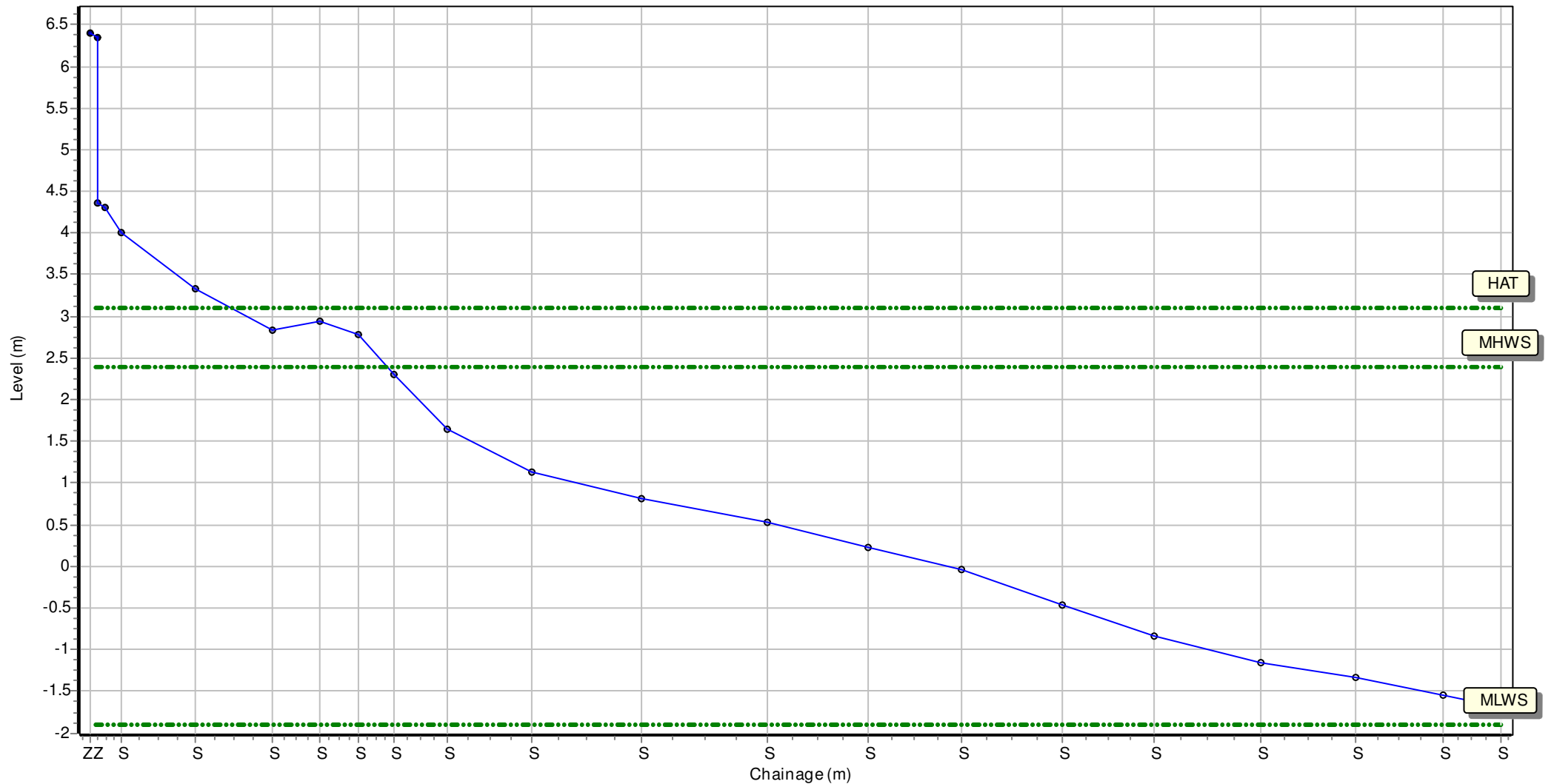
Sea State:

Visibility:

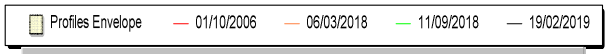
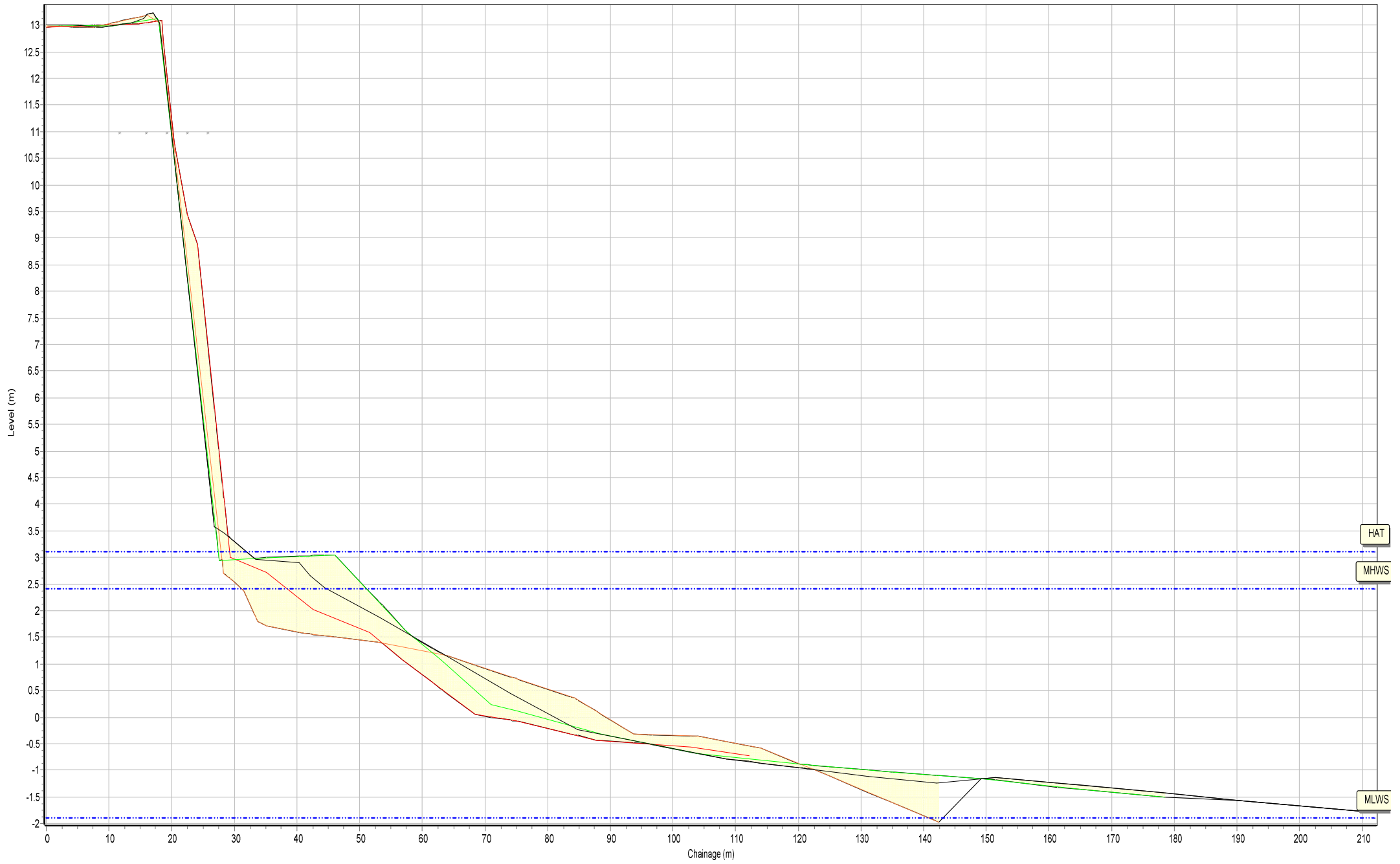
Rain:

Summary: 2019 Partial Measures Topo Survey

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



Beach Profiles: 1aNTDC01



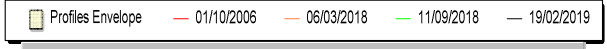
HAT

MHWS

MLWS

SANDS

Beach Profiles: 1aNTDC02



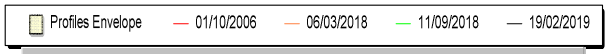
HAT

MHWS

MLWS

SANDS

Beach Profiles: 1aNTDC03



HAT

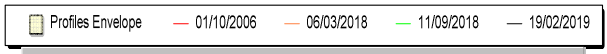
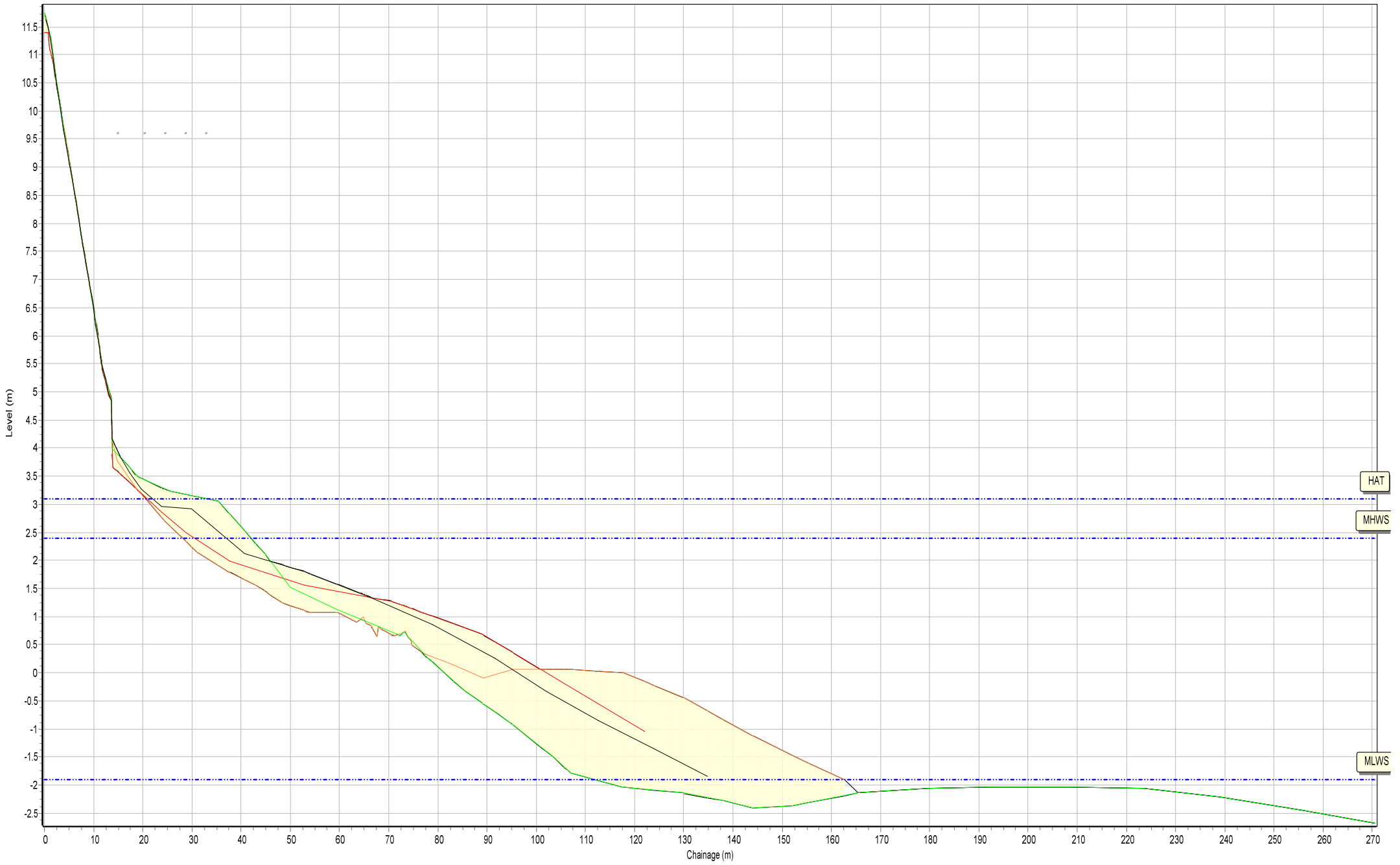
MHWS

MLWS

SANDS



# Beach Profiles: 1aNTDC04



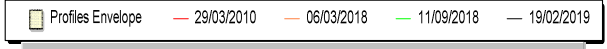
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MHWS

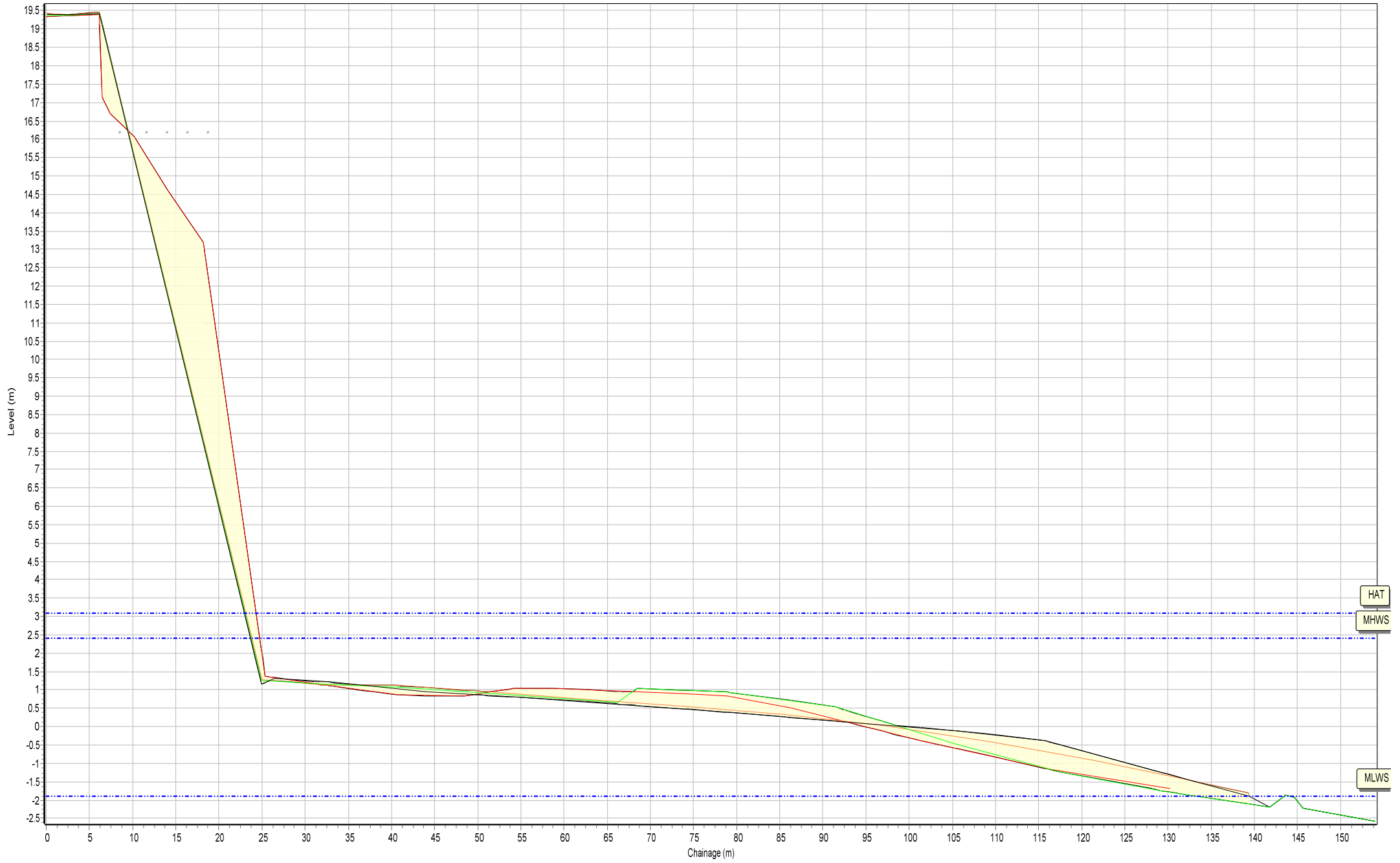
MLWS

SANDS

Beach Profiles: 1aNTDC04A



Beach Profiles: 1aNTDC05



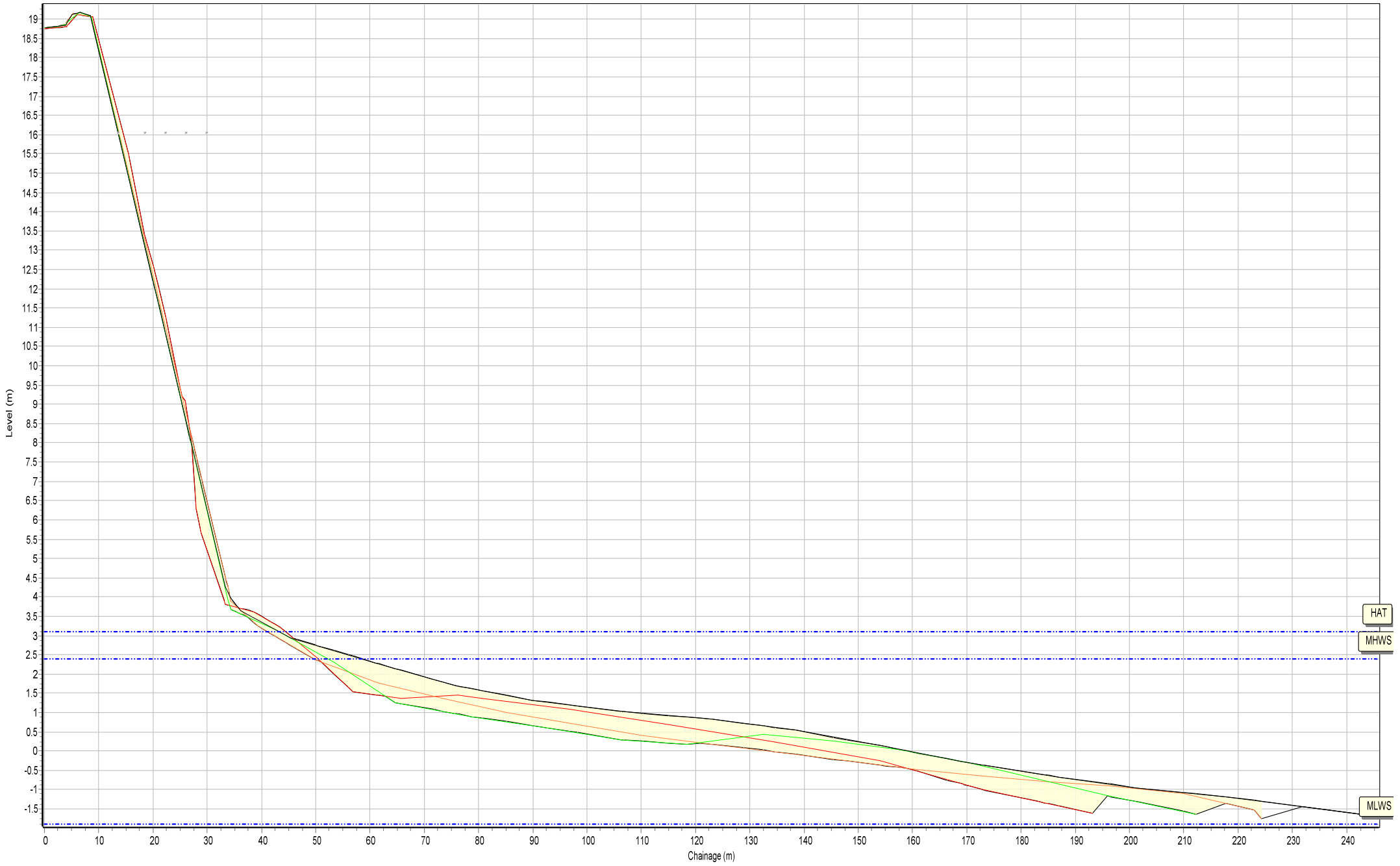
HAT

MHWS

MLWS

SANDS

Beach Profiles: 1aNTDC06



Profiles Envelope 01/10/2006 19/03/2018 10/09/2018 18/02/2019

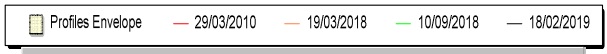
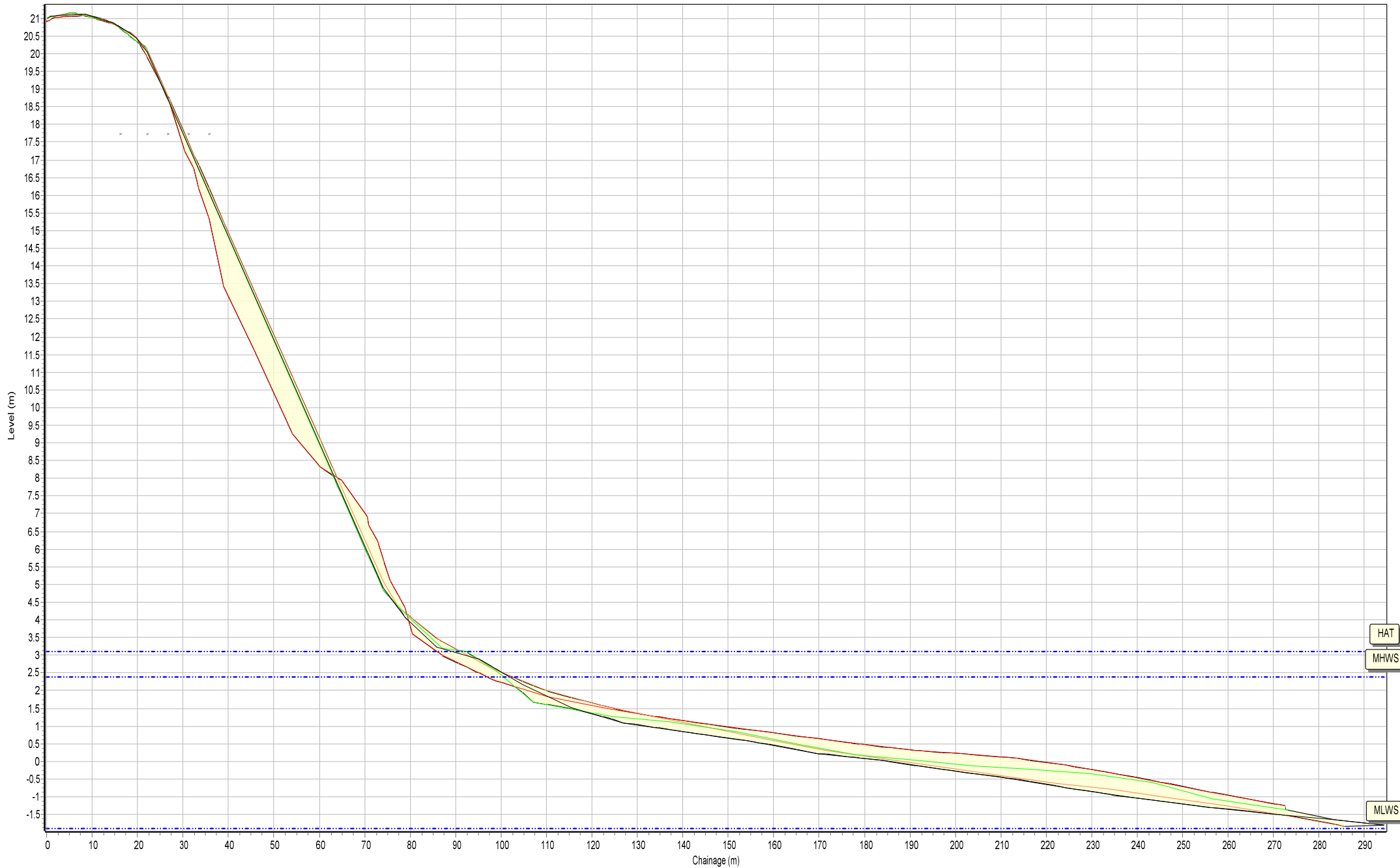
HAT

MHWS

MLWS

SANDS

Beach Profiles: 1aNTDC06A



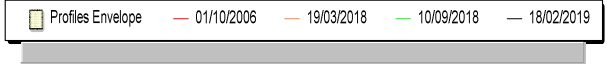
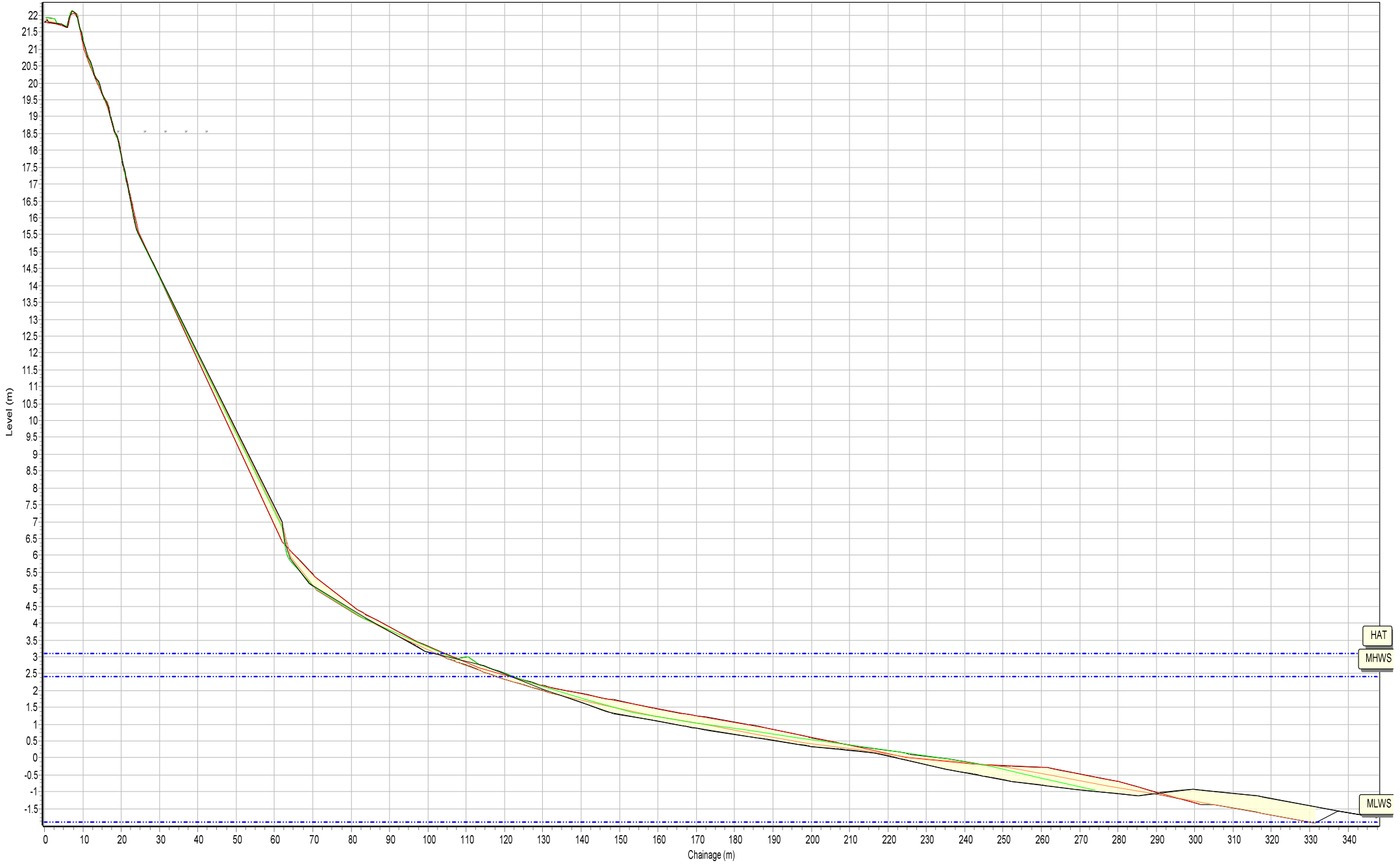
HAT

MHWS

MLWS

SANDS

Beach Profiles: 1aNTDC07



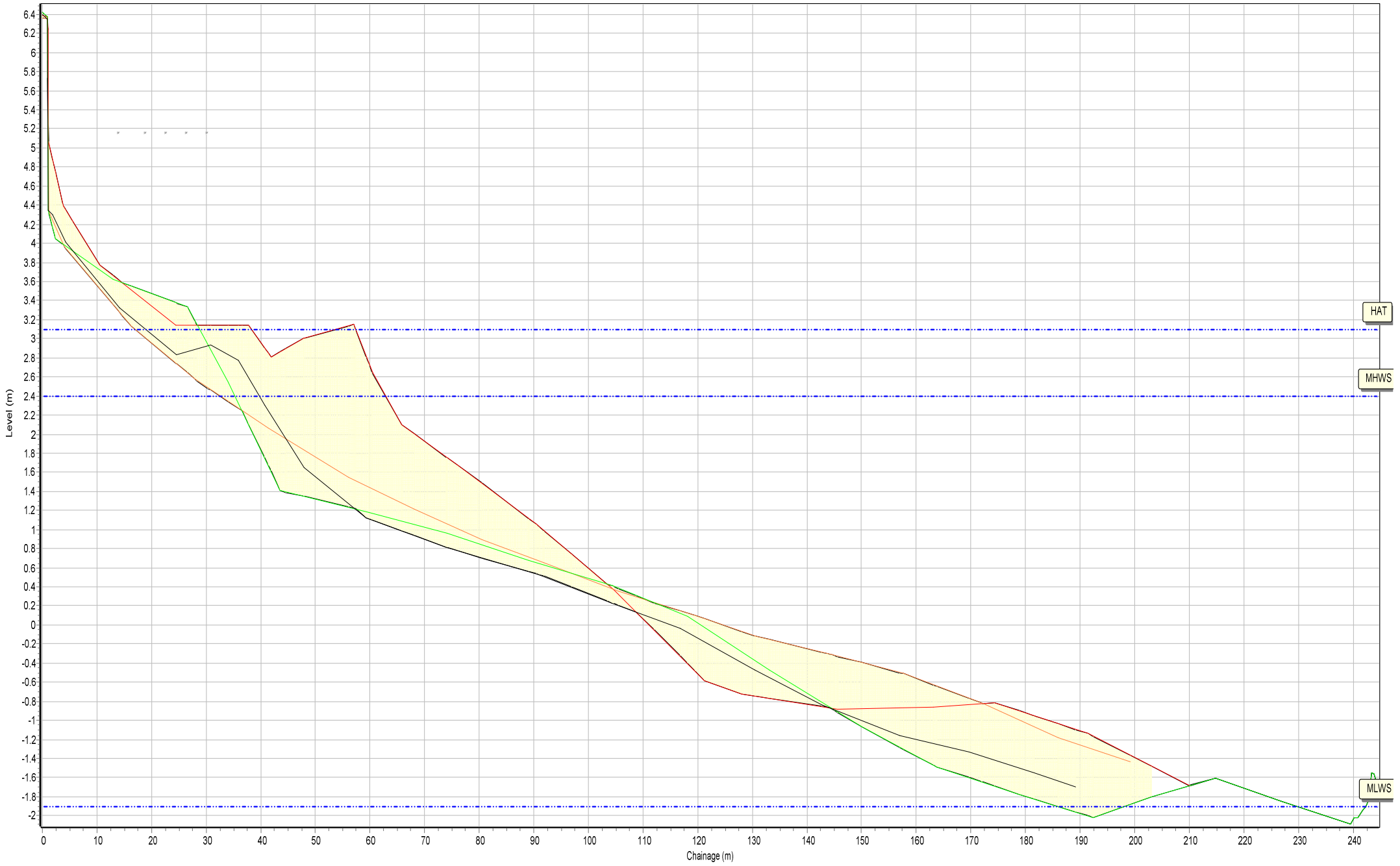
HAT

MHWS

MLWS

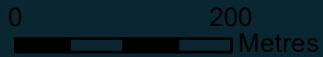
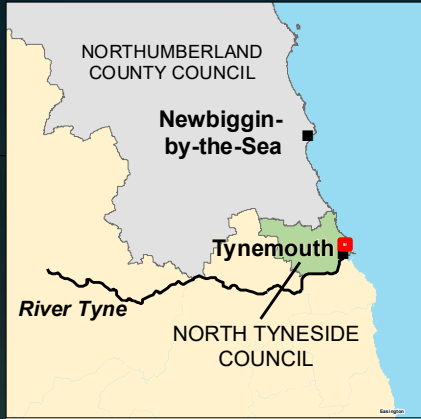
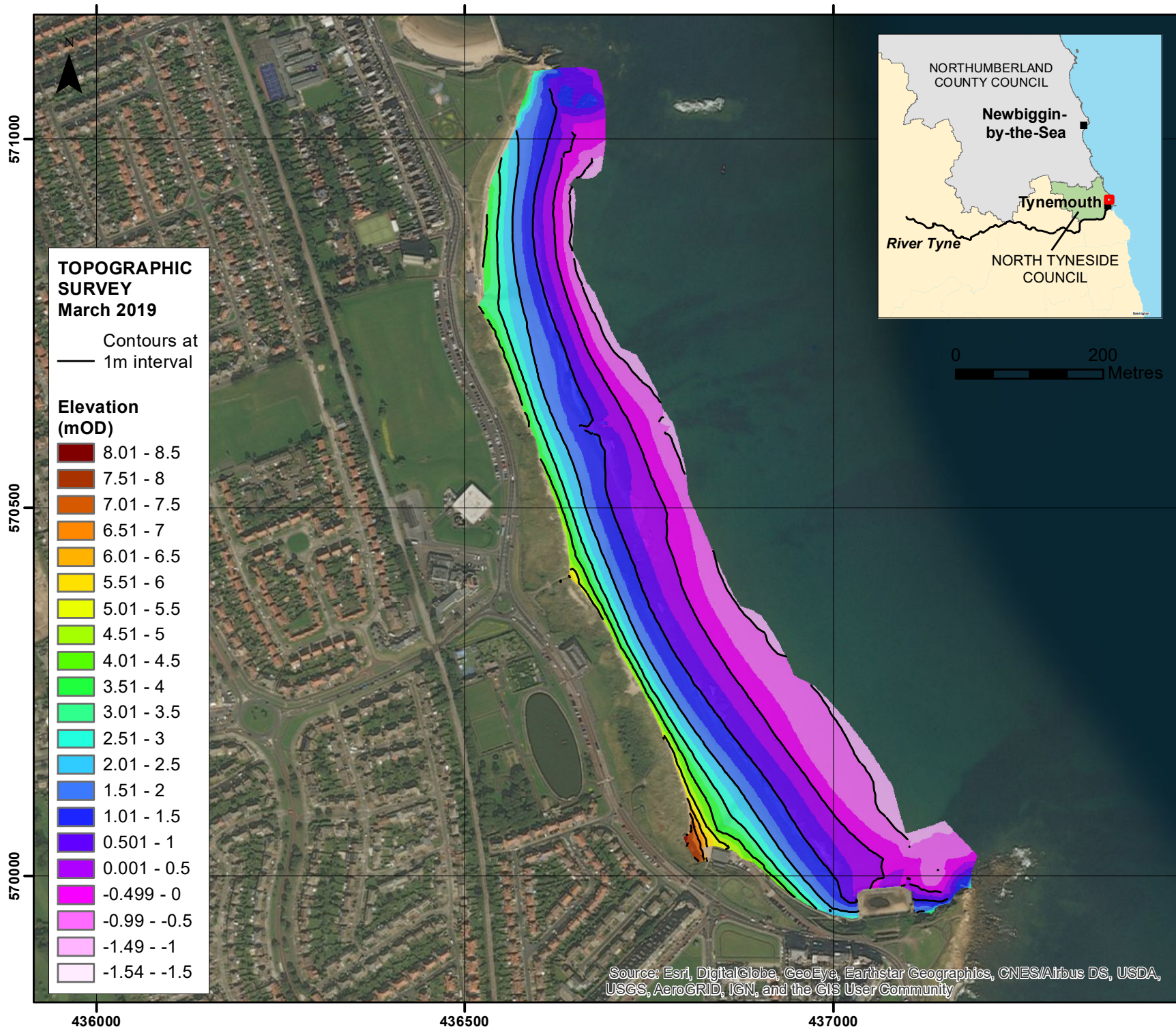
SANDS

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 2019

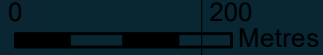
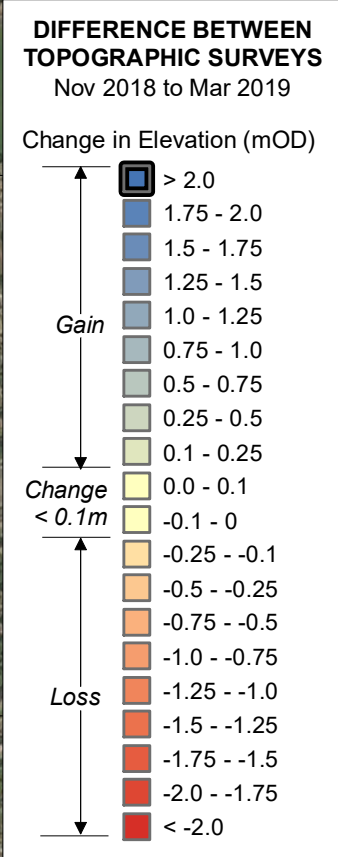
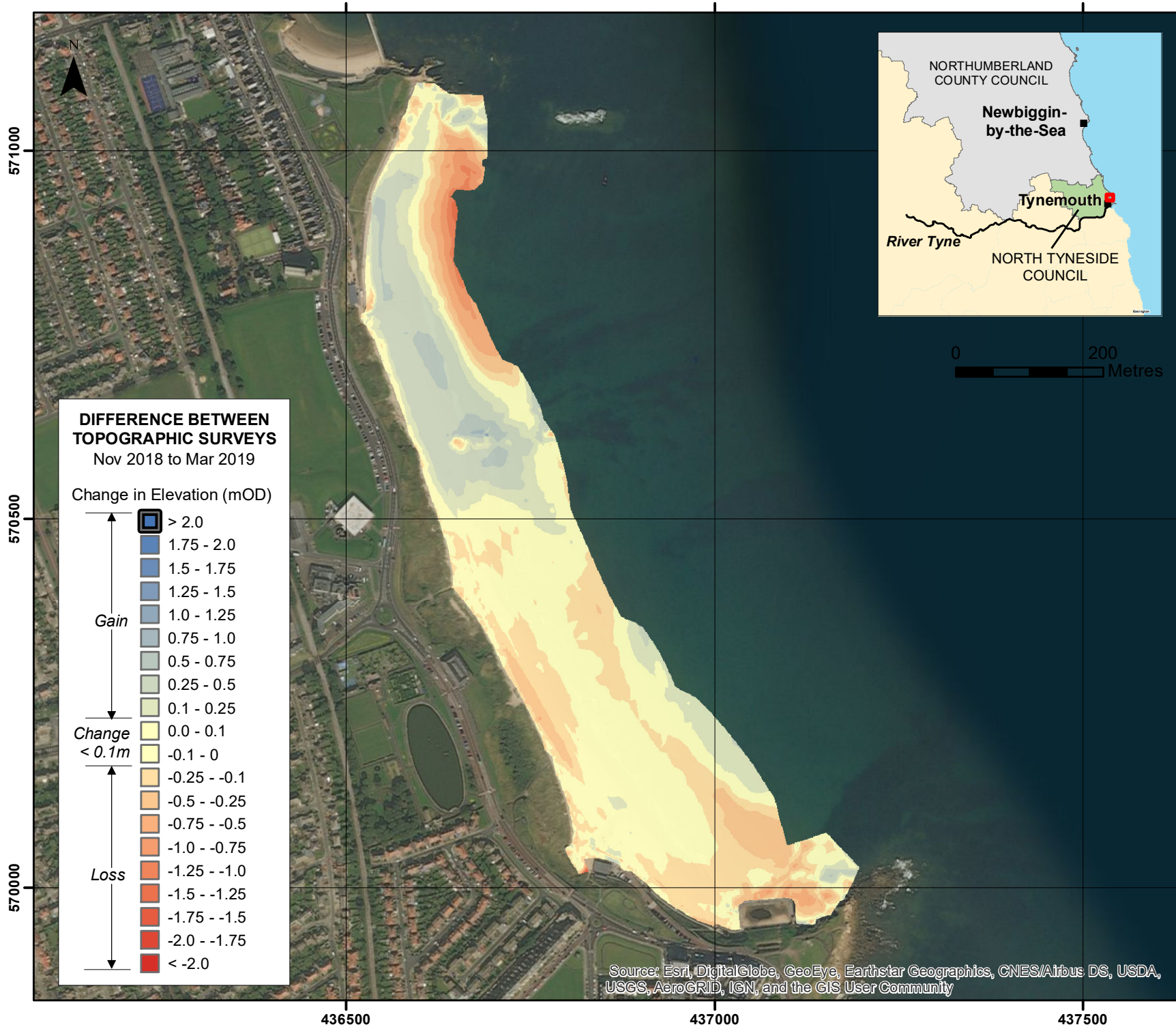
Drawing Scale at A4 1:7,000

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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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 2019

Drawing Scale at A4 1:7,000

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