



**Cell 1 Regional Coastal Monitoring Programme
Update Report 10: 'Partial Measures' Survey 2018**

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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 to Frenchman's Bay	Frenchman's Bay to Souter Point	Souter Point to Chourdon Point	Chourdon Point to Hartlepool Headland
1 in 200 year	3.41	3.44	3.66	3.91
HAT	2.85	2.88	3.18	3.30
MHWS	2.15	2.18	2.48	2.70
MLWS	-2.15	-2.12	-1.92	-1.90

Water Level Parameter	Water Level (m AOD)			
	Hartlepool Headland to Saltburn Scar	Skinninggrove	Hummersea Scar to Sandsend Ness	Sandsend Ness to Saltwick Nab
1 in 200 year	3.87	3.86	4.1	3.88
HAT	3.25	3.18	3.15	3.10
MHWS	2.65	2.68	2.65	2.60
MLWS	-1.95	-2.13	-2.15	-2.20

Source: *River Tyne to Flamborough Head Shoreline Management Plan 2.*
Royal Haskoning, February 2007.

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).

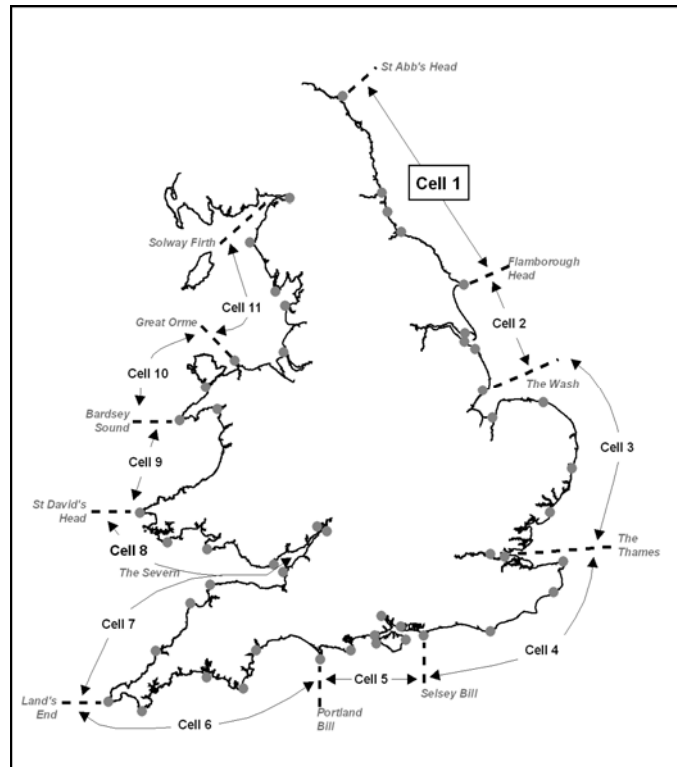


Figure 1 Sediment Cells in England and Wales

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/early winter 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		-
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	Sep-Oct 11	Oct 12	Mar-May 12	Oct 12	-
5	2012/13	Sep 12	Jan 13	Apr 13	May 13	-
6	2013/14	Sep-Oct 14	Feb 14	Mar 13	Jul 14	-
7	2014/15	Sep-Oct 14	Feb 15	Apr 15	Jun 15	-
8	2015/16	Aug 15	Feb 16	Apr 16	Jul 16	Jun 16
9	2016/17	Aug-Sep 16	Feb 17	Apr 17	Jul 17 (*)	
10	2017/18	Sep-Nov 17	Feb 18	Mar 18	May 18 (*)	

(*) The present report is **Update Report 10** and provides an analysis of the 2018 Partial Measures survey for Hartlepool Council's frontage.

1. Introduction

1.1 Study Area

Hartlepool Council's frontage extends from Crimdon Beck in the north to the North Gare Breakwater in the south. For the purposes of this report, it has been sub-divided into four areas, namely:

- North Sands
- Hartlepool Headland
- Middleton
- Hartlepool Bay

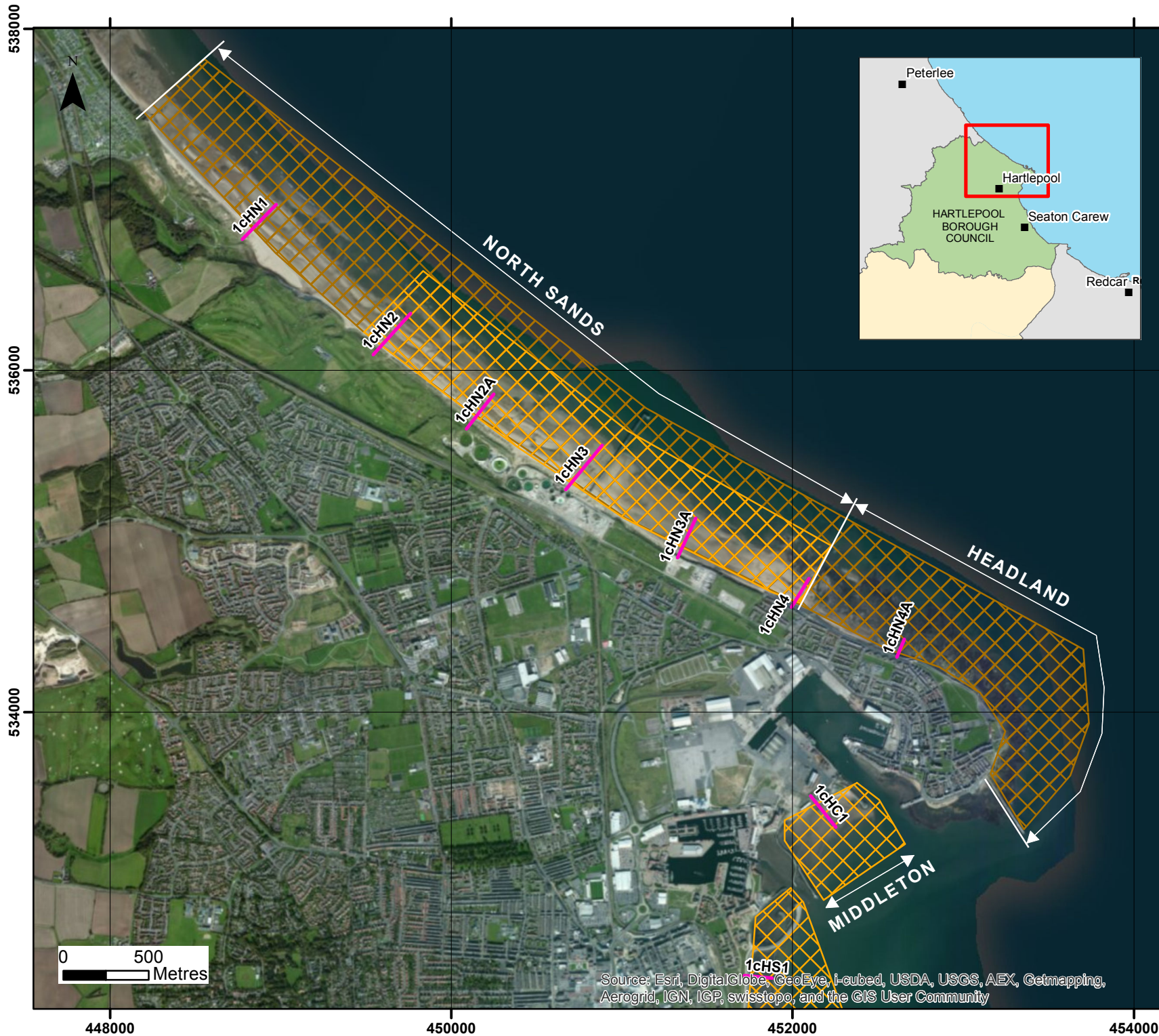
1.2 Methodology

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

- Full Measures survey annually each autumn/early winter comprising:
 - Beach profile surveys along twelve transect lines
 - Topographic survey along part of North Sands (referred to as Hartlepool North)
 - Topographic survey along Middleton (referred to as Hartlepool Central)
 - Topographic survey along Hartlepool Bay (referred to as Hartlepool South)
- Partial Measures survey annually each spring comprising:
 - Beach profile surveys along twelve transect lines
- Additionally, every five years (starting with 2008 as the baseline year), the Full Measures survey at Hartlepool North is extended to fully cover the whole of North Sands and Hartlepool Headland with a topographic survey. This extends across the boundary of jurisdiction between Hartlepool Borough Council and Durham County Council.

The location of these surveys is shown in Figure 2. The Partial Measures survey was undertaken along this frontage on the 5th, 7th, and 23rd March 2018. During this time weather conditions were dry and sunny/overcast with a varying sea state and wind. Full details of the weather conditions can be found in the surveyor's reports..

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
Hartlepool Borough
Council Frontage**

Analytical Report
Topo Surveys

Drawing Scale at A4 1:30,000

WATER
Royal HaskoningDHV
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Marlborough Crescent
Newcastle upon Tyne
NE1 4EE

Tel: +44 (0)191 211 1300
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www.royalhaskoningdhv.com



Source: Esri, DigitalGlobe, GeoEye, I-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



Key

SURVEY LOCATIONS

Topographic Profiles

- Annual
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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 2
Hartlepool Borough Council Frontage

Analytical Report
 Topo Surveys

Drawing Scale at A4 1:30,000

WATER
 Royal HaskoningDHV
 Marlborough House
 Marlborough Crescent
 Newcastle upon Tyne
 NE1 4EE

Tel: +44 (0)191 211 1300
 Fax: +44 (0)191 211 1313
www.royalhaskoningdhv.com



Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



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 3
Hartlepool Borough
Council Frontage

Analytical Report
 Topo Surveys

Drawing Scale at A4 1:12,000

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 Marlborough Crescent
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Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

2. Analysis of Survey Data

2.1 North Sands

Survey Date	Description of Changes Since Last Survey	Interpretation
5 th March 2018	<p>Beach Profiles:</p> <p>North Sands is covered by six beach profile lines during the Partial Measures survey (Appendix A) that were last surveyed in November 2017.</p> <p>Profile 1cHN1 is located within Durham County Council's jurisdiction, c. 400m north of the outfall of Crimdon Beck. It is reported here so changes can be interpreted in association with those observed elsewhere along North Sands.</p> <p>The beginning of the profile between 0m and 65m chainage covers dunes and has not changed. There have been varying amounts of erosion across the rest of the profile, ranging between 0.1m and 1.5m. The area of greatest erosion is between chainage 180m and 250m. Berms have formed in the mid (chainage 140m to 185m) and lower (chainage 230m to 310m) beach. Overall the profile is at a low-medium level compared to the range recorded from previous surveys, although it is at a more high level in the vicinity of the lower beach berm.</p> <p>Profile 1cHN2 covers the dune between chainage 0 and 50m. From chainage 55m to 240m the beach level has dropped by up to 1.2m since November 2017. The lower beach seawards of chainage 245m has accreted by 0.6m, pushing MLWS seawards by around 30m. The beach profile is at its lowest recorded level in the upper beach (chainage 55m to 95m) compared to the range recorded from previous surveys, low-medium in the middle beach, and medium in the lower beach.</p> <p>Profile 1cHN2a was established in October 2011 and runs through the dunes close to North Sands. The area of dunes to 75m chainage has remained stable since October 2011. At 75m the dune face remains stable following the large loss between October 2013 and March 2014. The beach profile shows erosion of up to 0.3m on the upper beach between chainage 75m and 180m, and up to 0.7m on the lower beach seawards of chainage 180m. the erosion at the toe of the beach has moved MLWS landwards by around 20m. Overall the beach is at a medium level compared to the range recorded from previous surveys.</p>	<p>The profiles are at or near the lowest elevation, particularly in the upper beach, with platforms exposed. This pattern is typical of winter conditions.</p> <p>Longer term trends:</p> <p>Following dune erosion over the winter of 2013/14 the areas with dunes have remained stable. At HN1 and 2 the beach levels are low-medium compared with previous years. At HN2a the beach is in the middle of the range of profiles showing likely seasonal fluctuation.</p> <p>At profiles HN3a, 4 and 4a the beach is low compared with previous profiles for at least some of the profile. The fluctuation in the veneer beach continues so that parts of the shore platform in the south of the bay have become exposed.</p>

Survey Date	Description of Changes Since Last Survey	Interpretation
	<p>At Profile 1cHN3 there has been little change to the dunes. The upper beach between chainage 40m and 115m has dropped by up to 0.8m. Between chainage 115m and 260m the beach has accreted slightly by up to 0.2m. The toe of the beach seawards of 260m shows accretion of 0.2m. The upper beach is at its lowest recorded level between chainage 45m and 85m, whilst the remainder of the profile is at a medium level compared to the range recorded from previous surveys.</p> <p>At Profile 1cHN3a the dune front at 20m chainage has remained stable. Beyond 20m chainage there is a general trend of erosion of up to 1m at the toe of the dunes, but more typically up to 0.4m. The exception is between chainage 175m and 220m where there has been accretion of up to 0.4m. The upper beach is at its lowest recorded level between chainage 20m and 70m, whilst the mid beach is at a medium-low level compared to the range recorded from previous surveys, and the lower beach seawards of chainage 180m is at a medium-high level.</p> <p>Profile 1cHN4 shows little change in the defended part of the profile. Between chainage 15m and 50m the sandy upper beach has been removed by up to 0.8m, exposing the rock beneath. Between chainage 50m and 105m there has been accretion of up to 0.8m forming a large berm. Between chainage 105m and 142m there has been erosion of up to 0.6m, exposing the rocks. From chainage 110m to the end of the survey at 200m chainage the rocks at the bottom of the beach are exposed, which is common for this profile. Overall the profile is at a relatively low level compared to the range recorded from the previous surveys, with the exception being between chainage 55m and 90m in the vicinity of the berm which is at its highest recorded level.</p> <p>Profile 1cHN4a was established in October 2011. The defended part of the profile to 10m chainage has not changed since October 2011. The rocky shore platform is exposed over the remainder of the profile, which is due to a drop in beach level of up to 1.0m since the previous survey in November 2017 between chainage 10m and 47m. From chainage 47m seawards the rock platform remains exposed as it was in the previous survey. The profile is therefore at a relatively low level compared to the range recorded in previous surveys as no beach is present at all, with the rock platform exposed over the full profile.</p>	

2.2 Middleton

Survey Date	Description of Changes Since Last Survey	Interpretation
<p>23rd March 2018</p>	<p>Beach Profiles:</p> <p>Middleton is covered by one beach profile line during the Partial Measures survey (Appendix A). The profile was last surveyed in September 2017.</p> <p>At Profile 1cHC1 the face of the defence at 50m chainage remained stable. Between chainage 50m and 155m the beach level has dropped by up to 1.1m since September 2017, creating a steeper upper beach. A berm has formed at chainage 105m, 0.4m high. Seawards of 155m there has been accretion of up to 0.4m, resulting in a flatter lower beach. The toe of the beach has moved seawards by around 30m. The upper beach is at its lowest recorded level between chainage 50m and 105m, but at a more medium level through the middle beach and at its highest recorded level in the lower beach, seawards of chainage 155m.</p>	<p>The upper part of the beach was low compared to historical levels, but the seaward part of the beach is high. The decreasing of levels on the upper beach may be due to beach draw down or the impact of large waves reflecting off the seawall and scoring down.</p> <p>Longer term trends: The beach level at this location tends to fluctuate through the year, with the most variable area being adjacent to the sea wall where wave energy is reflected. There is a pattern of seasonal variation, with lower levels typically recorded in the spring, following the period of winter storms. Recovery tends to occur by the autumn.</p>

2.3 Hartlepool Bay

Survey Date	Description of Changes Since Last Survey	Interpretation
7 th March 2018	<p>Beach Profiles:</p> <p>Hartlepool Bay is covered by four beach profile lines during the Partial Measures survey (Appendix A).</p> <p>Profile 1cHS1 is located c. 150m south of the root of the South Pier. The profile starts at the wall to the rear of the promenade and extends over the fronting concrete splash wall and down the sloping face of the rock armour revetment before reaching the beach. Very little change has occurred until 40m chainage, which is the toe of the sea defences, since September 2014. There has been erosion of up to 0.9m across the beach profile. The toe of the beach has moved landwards by around 45m. Overall the beach is at a low level compared to the range recorded from previous surveys, with the section seawards of chainage 45m being the lowest on record.</p> <p>At Profile 1cHS2 there has been a drop in levels of up to 0.5m across most of the profile from the base of the seawall at chainage 20m to chainage 225m. Seawards of chainage 225m there has been accretion of up to 0.3m, extending the toe of the beach seawards by around 60m. The result of this is a flatter profile, particularly at the toe. Overall the profile is at a relatively medium level compared to the range recorded from previous surveys, with the lower beach being medium-high.</p> <p>Profile 1cHS3 shows no changes over the defended part of the profile up to 30m chainage. There has been a drop in levels of up to 0.6m across the whole beach profile. Overall the profile is at a relatively medium level compared to the range recorded from previous surveys.</p> <p>Profile 1cHS4 is located 1km north of the North Gare Breakwater, within the area of undefended dunes at Seaton Carew. The part of the profile dominated by dunes, to 290m chainage, has remained stable. The depression between the main body of dunes and the foredune at 300m chainage has been deepening since 2013, however the March 2018 profile suggests slight recovery of 0.1m. The photographs suggesting lowering may result from footpath erosion. The crest of the foredune at 320m chainage has remained stable since November 2017. Between chainage 340m and 415m the beach level has dropped by up to 1.4m, with the berm feature previously recorded at chainage 365m since April 2016 being removed. Between chainage 415m and 500m there has been accretion of up to 0.5m, with the formation of a small berm at chainage 450m suggesting drawdown from the upper beach. Seawards of chainage 500m there has been erosion of up to 0.4m. The overall effect of the changes is</p>	<p>Overall the profiles show that the beach is at a relatively medium level in most places, except for profile 1cHS1 which is relatively low</p> <p>The dunes are in good condition. The foredune continues to accrete but erosion associated with a walkway is causing localised lowering in HS4 that may affect stability of the wider dune system in the long term.</p> <p>Longer term trends: Beach levels within Hartlepool Bay in March 2018 were at a medium level in comparison to previous surveys. The beach levels have been progressively increasing across the bay.</p>

Survey Date	Description of Changes Since Last Survey	Interpretation
	a steeper lower beach profile than that recorded in November 2017. Overall the profile is at a medium level compared to the range recorded by the previous surveys.	

3. Problems Encountered and Uncertainty in Analysis

Individual Profiles

- At Middleton there was no access to upper section on profile 1cHC1.
- A new sand fence was present at the top of the beach at sections 1cHN1 and 1cHN3.
- There was a body of water present at section 1cHN1 between chainages 234m and 236m preventing survey in that area.
- Construction work was being carried out on new coastal defences to the east of profile 1cHN4A.
- The rest of the survey was completed without incident.

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

No changes are recommended at the present time.

5. Conclusions and Areas of Concern

- At North Sands the dunes are stable and the beaches are healthy, although the sand depletes as you move east towards the headland, with HN4 showing an exposure of the wave cut platform. The profiles are at or near the lowest elevation, particularly in the upper beach, with platforms exposed. This pattern is typical of winter conditions.
- At Middleton the upper beach level has dropped and the lower beach level has increased. The observed behaviour is likely to be due to beach draw down through the winter of 2017/18 and levels should recover through the summer.
- Hartlepool Bay has generally been dominated by erosion, however the profiles remain at medium levels compared to the range recorded from previous surveys.. In the south of the bay at 1cHS4 the dunes are stable but people walking over them may affect their stability long term.

Appendices

Appendix A
Beach Profiles

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

Code	Description
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: 1cHN1

Date: 05/03/2018

Inspector: AG

Low Tide:

Low Tide Time:

Wind

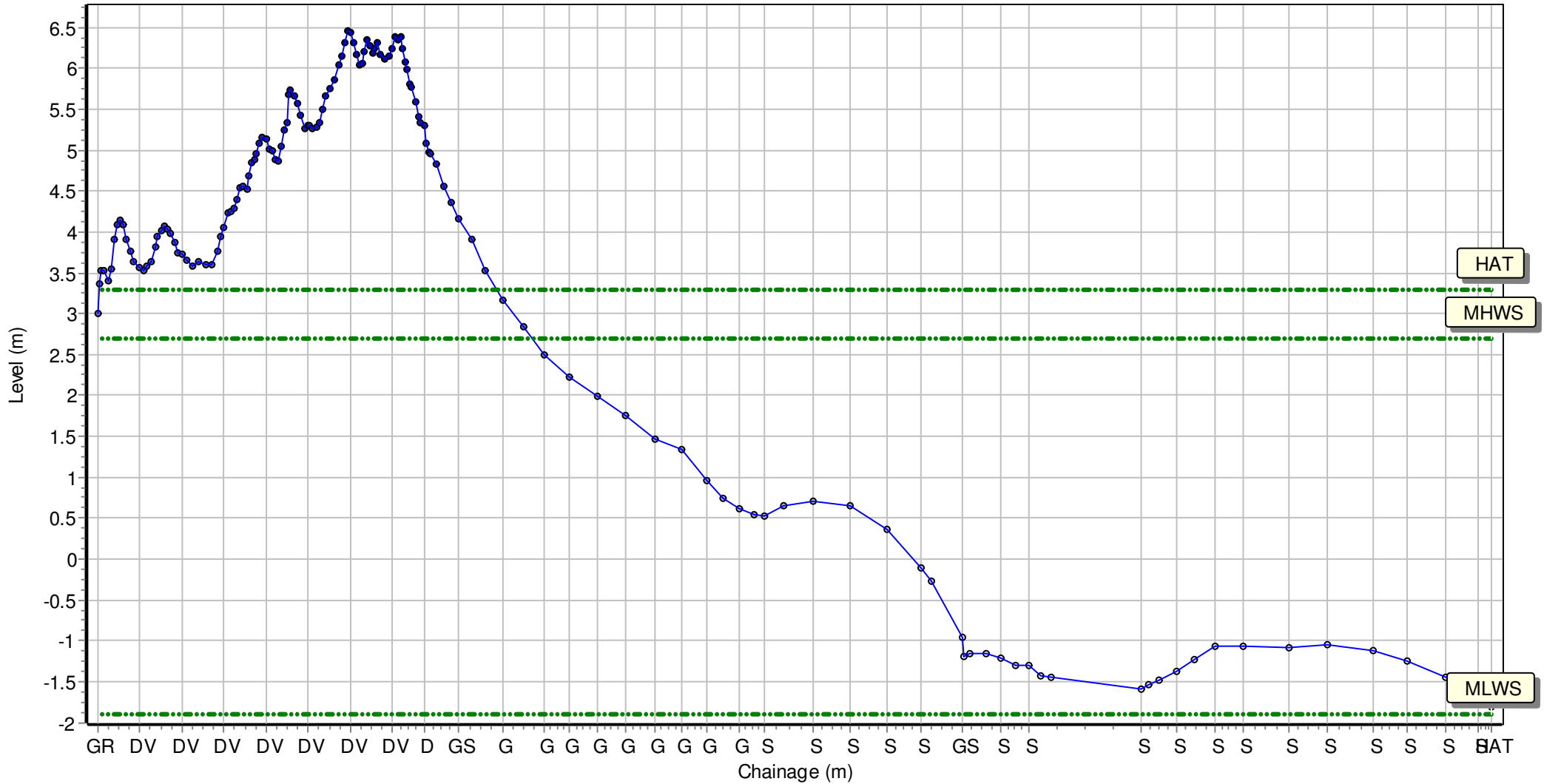
Sea State:

Visibility:

Rain:

Summary: 2018 Partial Measures Topo Survey

Easting: 448779.624 Northing: 536767.42 Profile Bearing: 44 ° from North



Beach Profile

Location: 1cHN2

Date: 05/03/2018

Inspector: AG

Low Tide:

Low Tide Time:

Wind

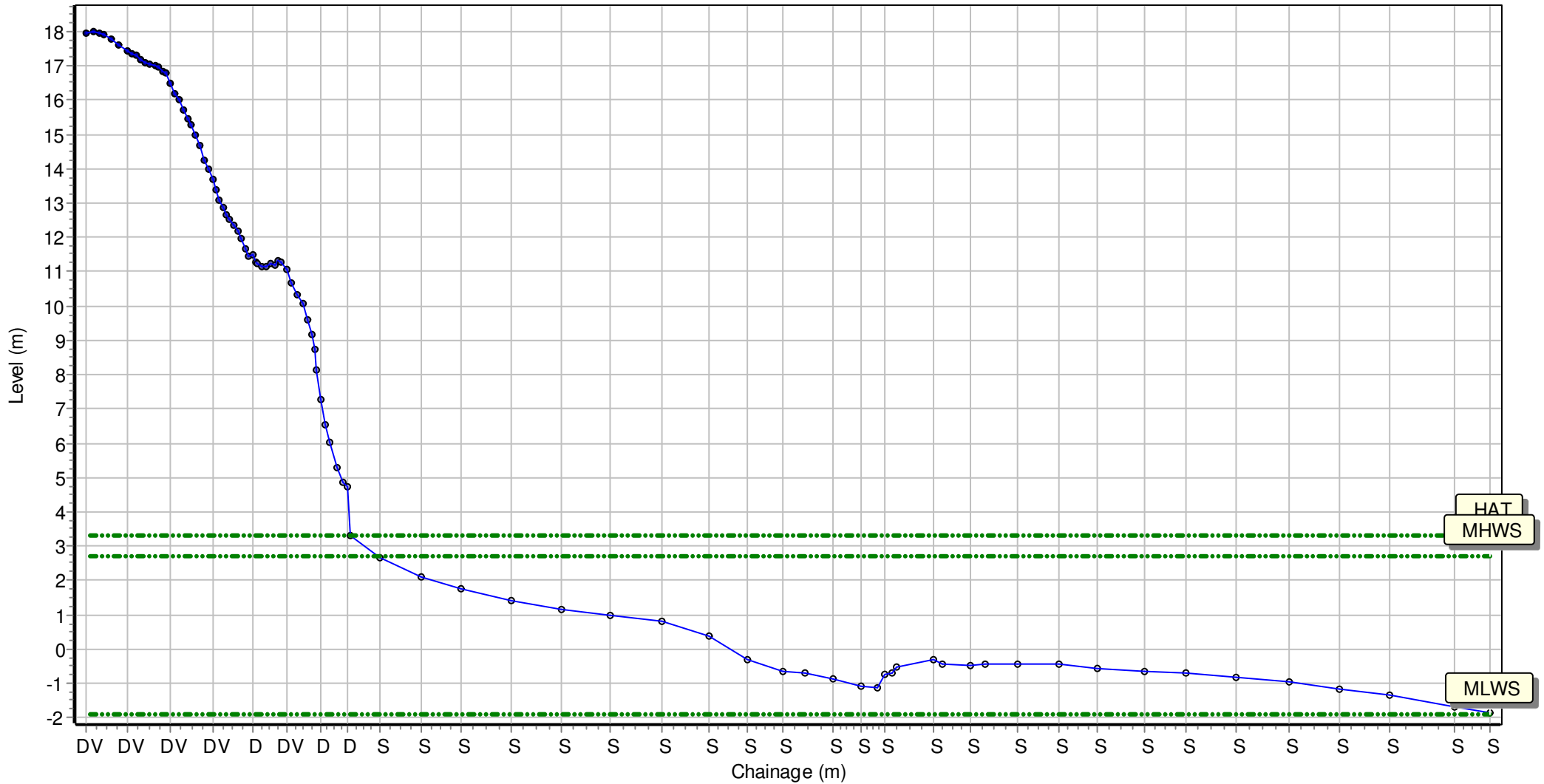
Sea State:

Visibility:

Rain:

Summary: 2018 Partial Measures Topo Survey

Easting: 449547.217 Northing: 536095.458 Profile Bearing: 42 ° from North



Beach Profile

Location: 1cHN2A

Date: 05/03/2018

Inspector: AG

Low Tide:

Low Tide Time:

Wind

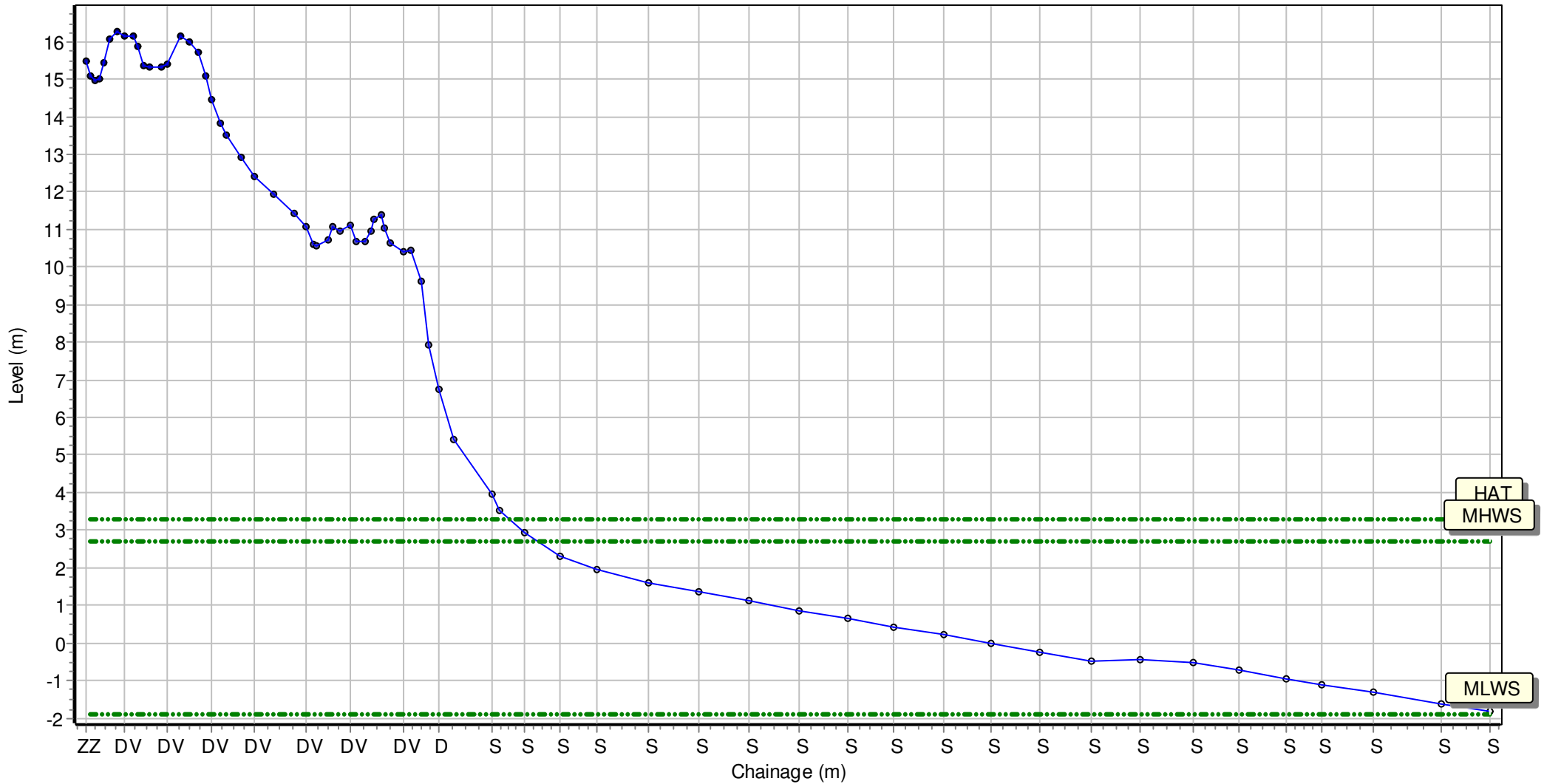
Sea State:

Visibility:

Rain:

Summary: 2018 Partial Measures Topo Survey

Easting: 450088.047 Northing: 535658.212 Profile Bearing: 39 ° from North



Beach Profile

Location: 1cHN3

Date: 05/03/2018 Inspector: AG

Low Tide:

Low Tide Time:

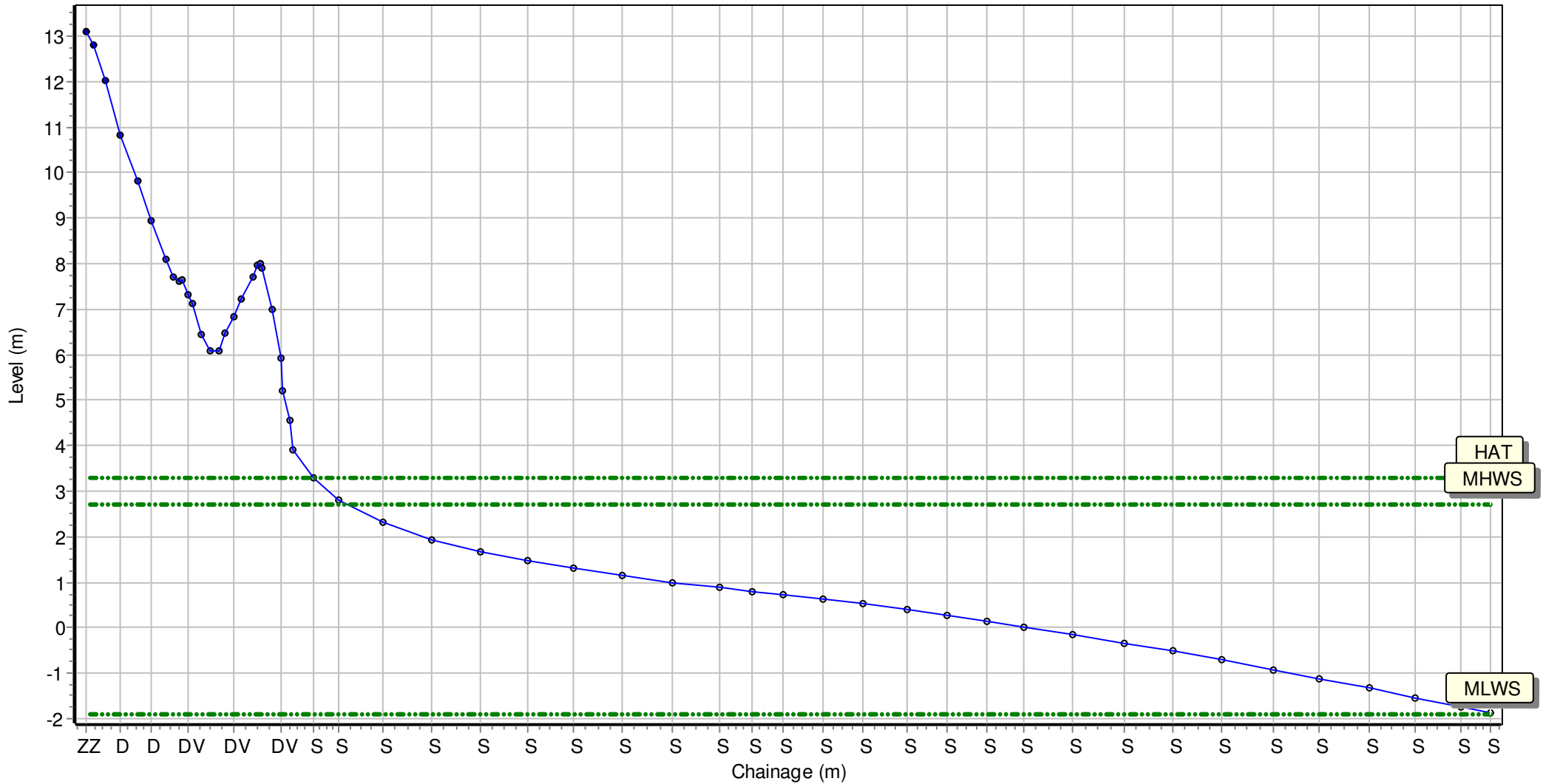
Wind Sea State:

Visibility:

Rain:

Summary: 2018 Partial Measures Topo Survey

Easting: 450674.424 Northing: 535305.141 Profile Bearing: 30 ° from North



Beach Profile

Location: 1cHN3A

Date: 05/03/2018

Inspector: AG

Low Tide:

Low Tide Time:

Wind

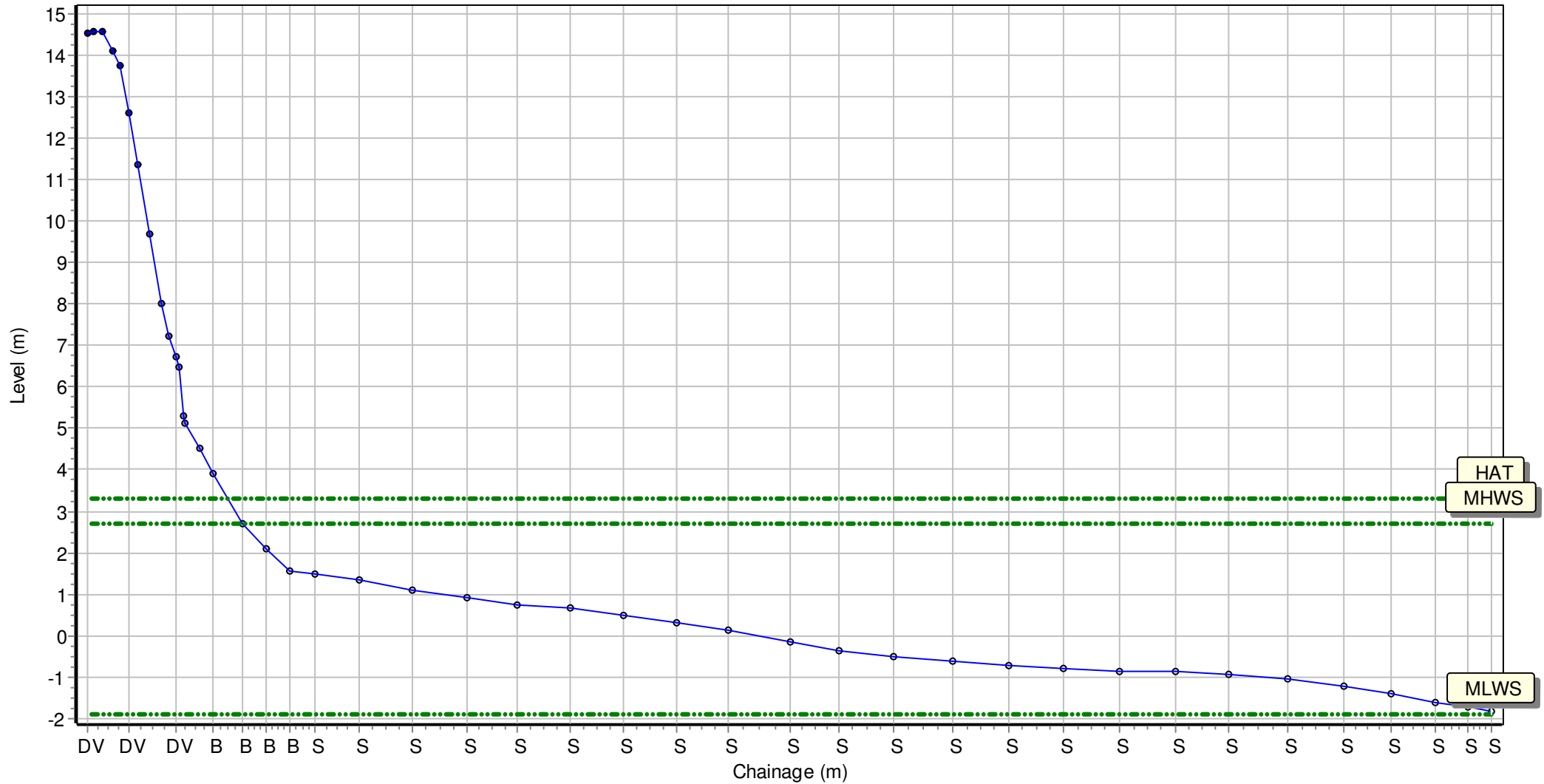
Sea State:

Visibility:

Rain:

Summary: 2018 Partial Measures Topo Survey

Easting: 451324.71 Northing: 534903.35 Profile Bearing: 25 ° from North



Beach Profile

Location: 1cHN4

Date: 05/03/2018

Inspector: AG

Low Tide:

Low Tide Time:

Wind

Sea State:

Visibility:

Rain:

Summary: 2018 Partial Measures Topo Survey

Easting: 451997.114 Northing: 534616.627 Profile Bearing: 25 ° from North



Beach Profile

Location: 1cHN4A

Date: 05/03/2018

Inspector: AG

Low Tide:

Low Tide Time:

Wind

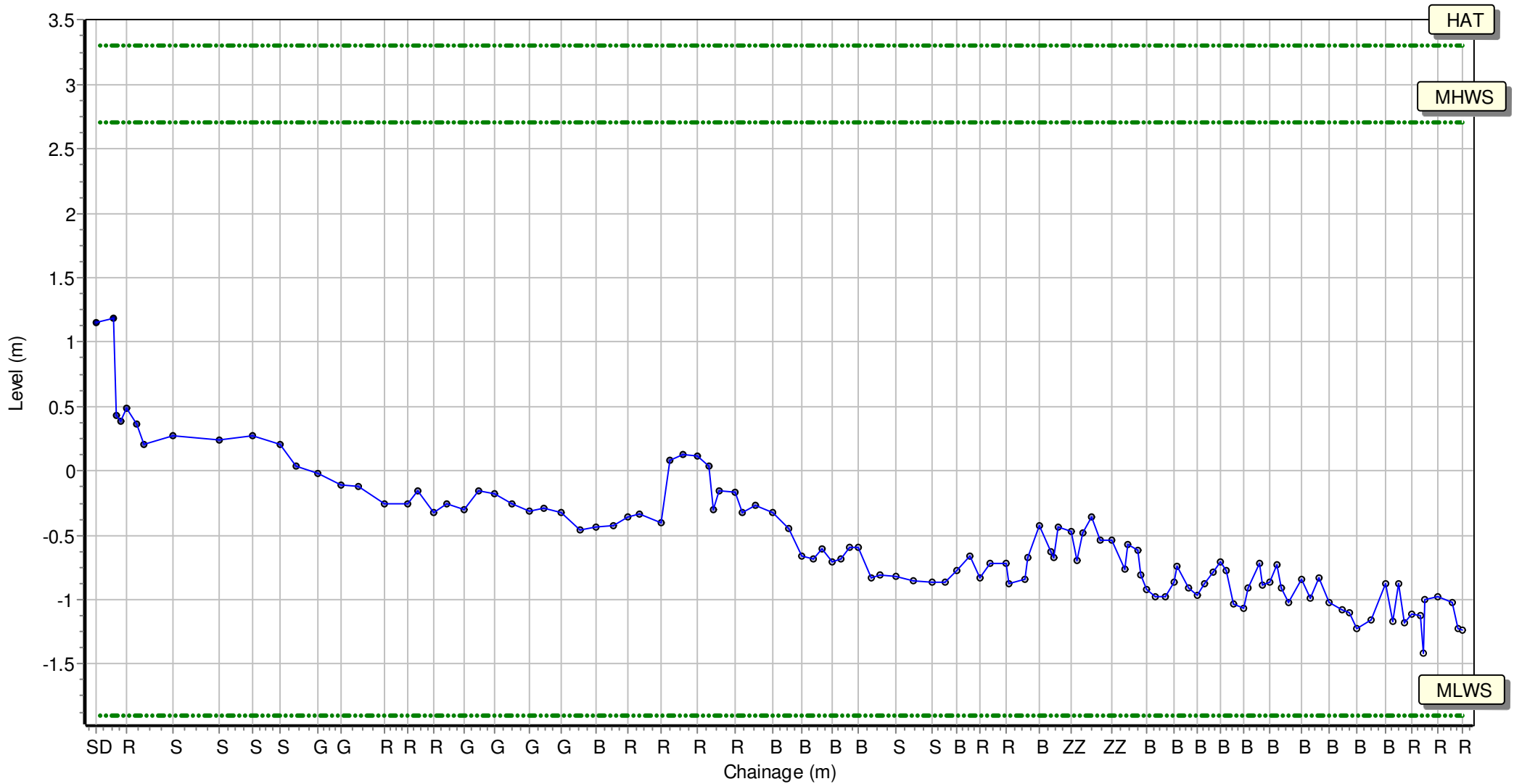
Sea State:

Visibility:

Rain:

Summary: 2018 Partial Measures Topo Survey

Easting: 452610.565 Northing: 534321.038 Profile Bearing: 23 ° from North



Beach Profile

Location: 1cHC1

Date: 23/03/2018

Inspector: AG

Low Tide:

Low Tide Time:

Wind

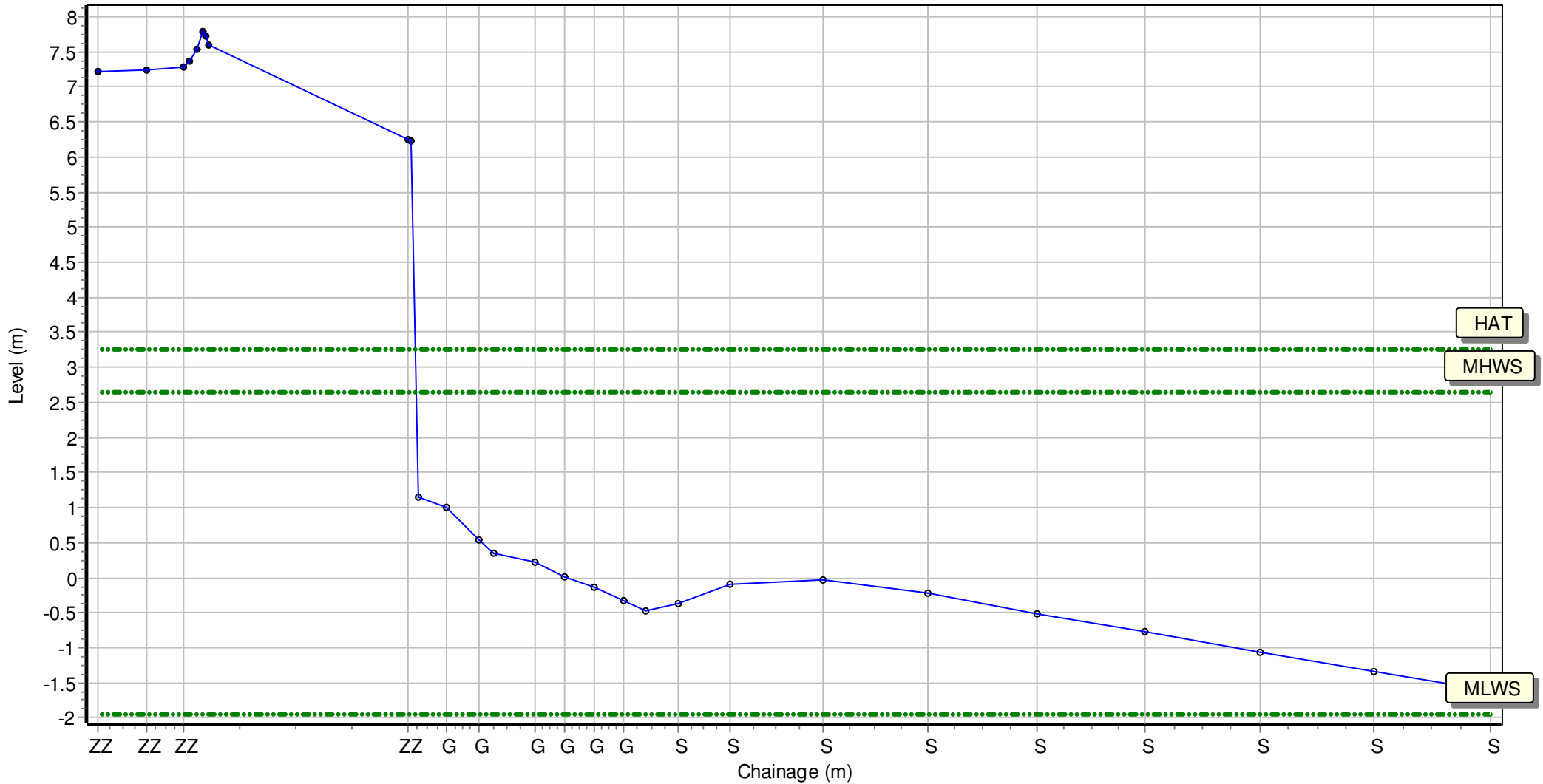
Sea State:

Visibility:

Rain:

Summary: 2018 Partial Measures Topo Survey

Easting: 452108.075 Northing: 533506.119 Profile Bearing: 150 ° from North



Beach Profile

Location: 1cHS1

Date: 07/03/2018

Inspector: AG

Low Tide:

Low Tide Time:

Wind

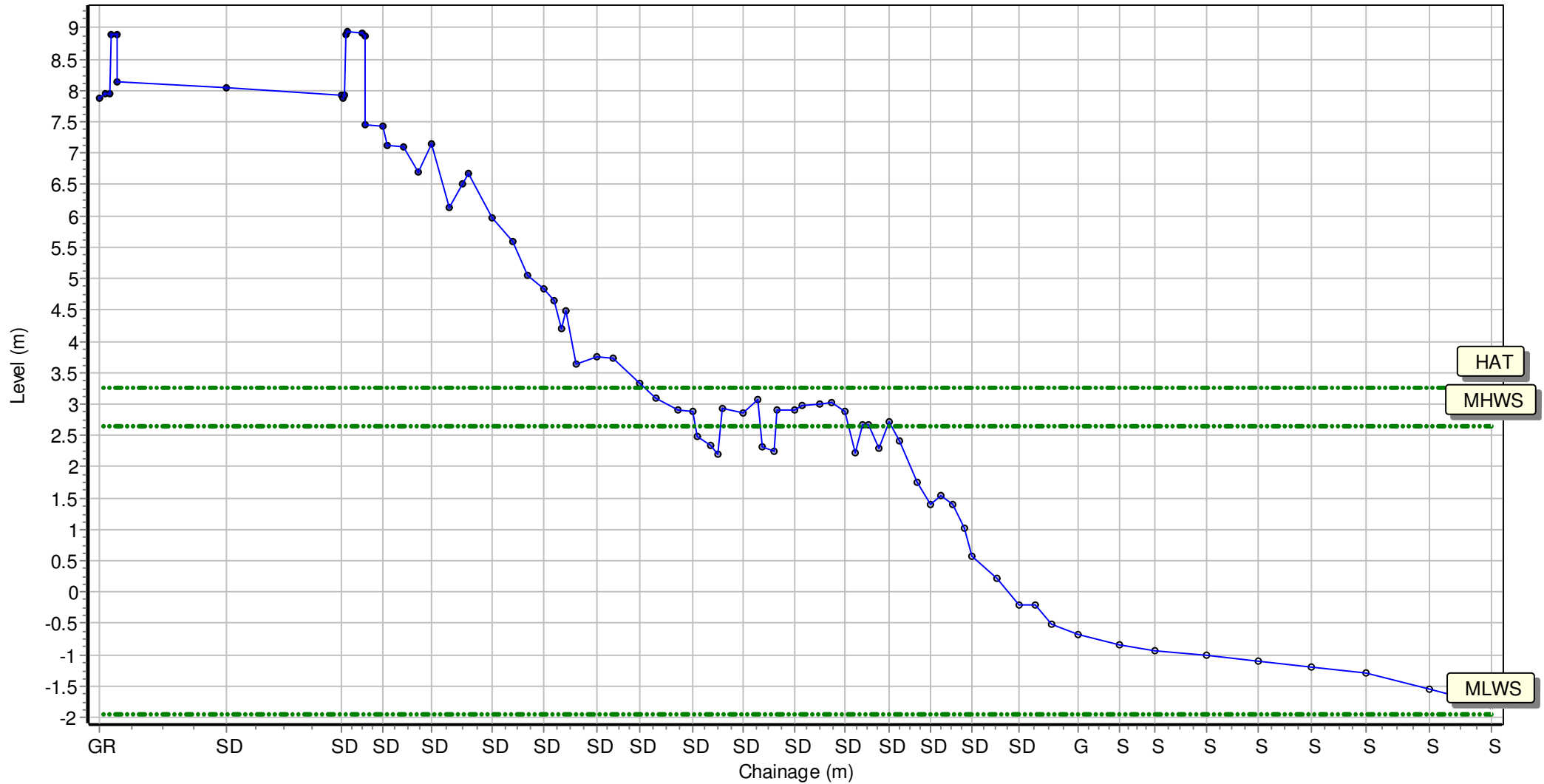
Sea State:

Visibility:

Rain:

Summary: 2018 Partial Measures Topo Survey

Easting: 451718 Northing: 532455 Profile Bearing: 95 ° from North



Beach Profile

Location: 1cHS2

Date: 07/03/2018

Inspector: AG

Low Tide:

Low Tide Time:

Wind

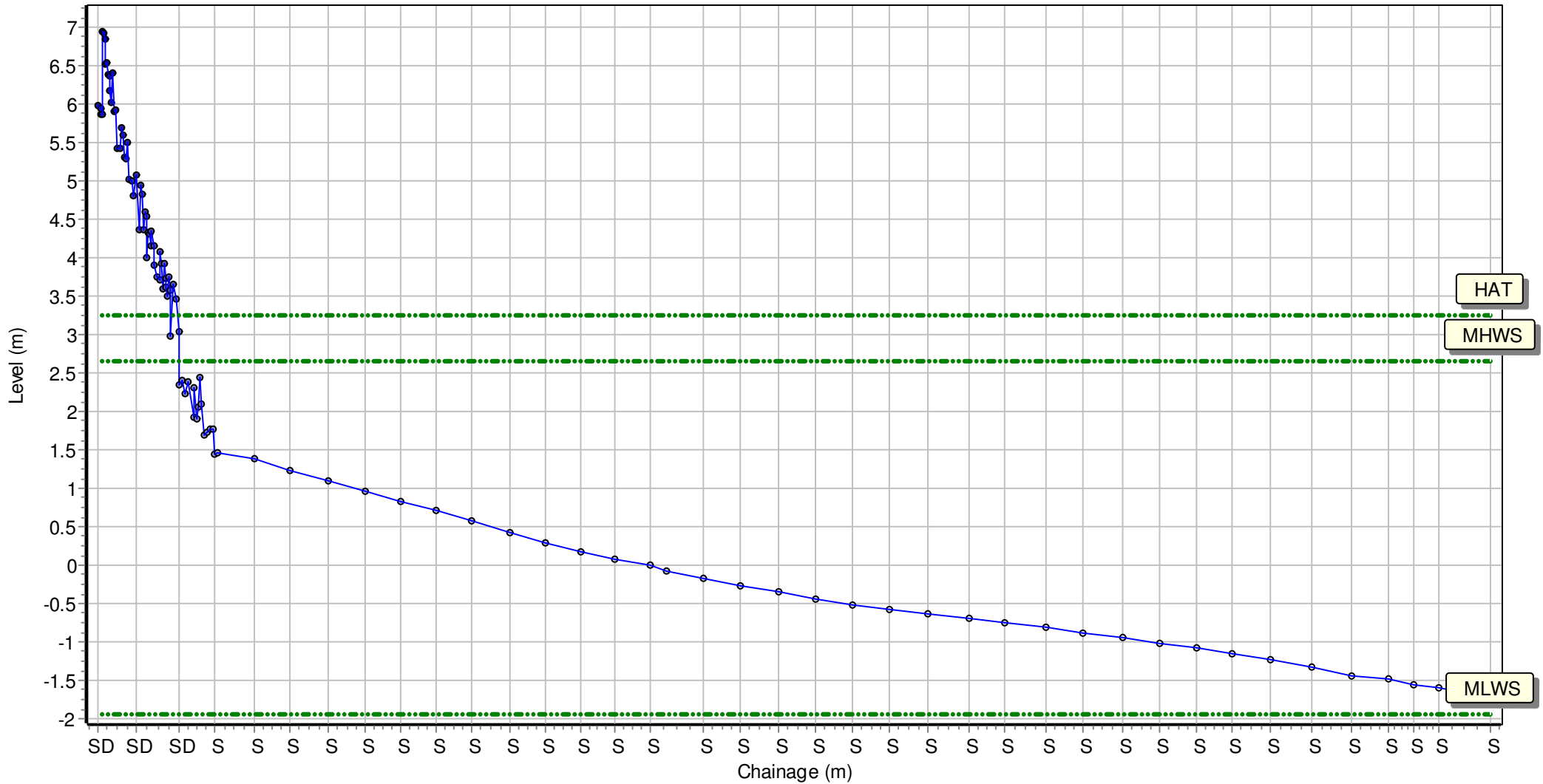
Sea State:

Visibility:

Rain:

Summary: 2018 Partial Measures Topo Survey

Easting: 452160.59 Northing: 531071.39 Profile Bearing: 77 ° from North



Beach Profile

Location: 1cHS3

Date: 07/03/2018

Inspector: AG

Low Tide:

Low Tide Time:

Wind

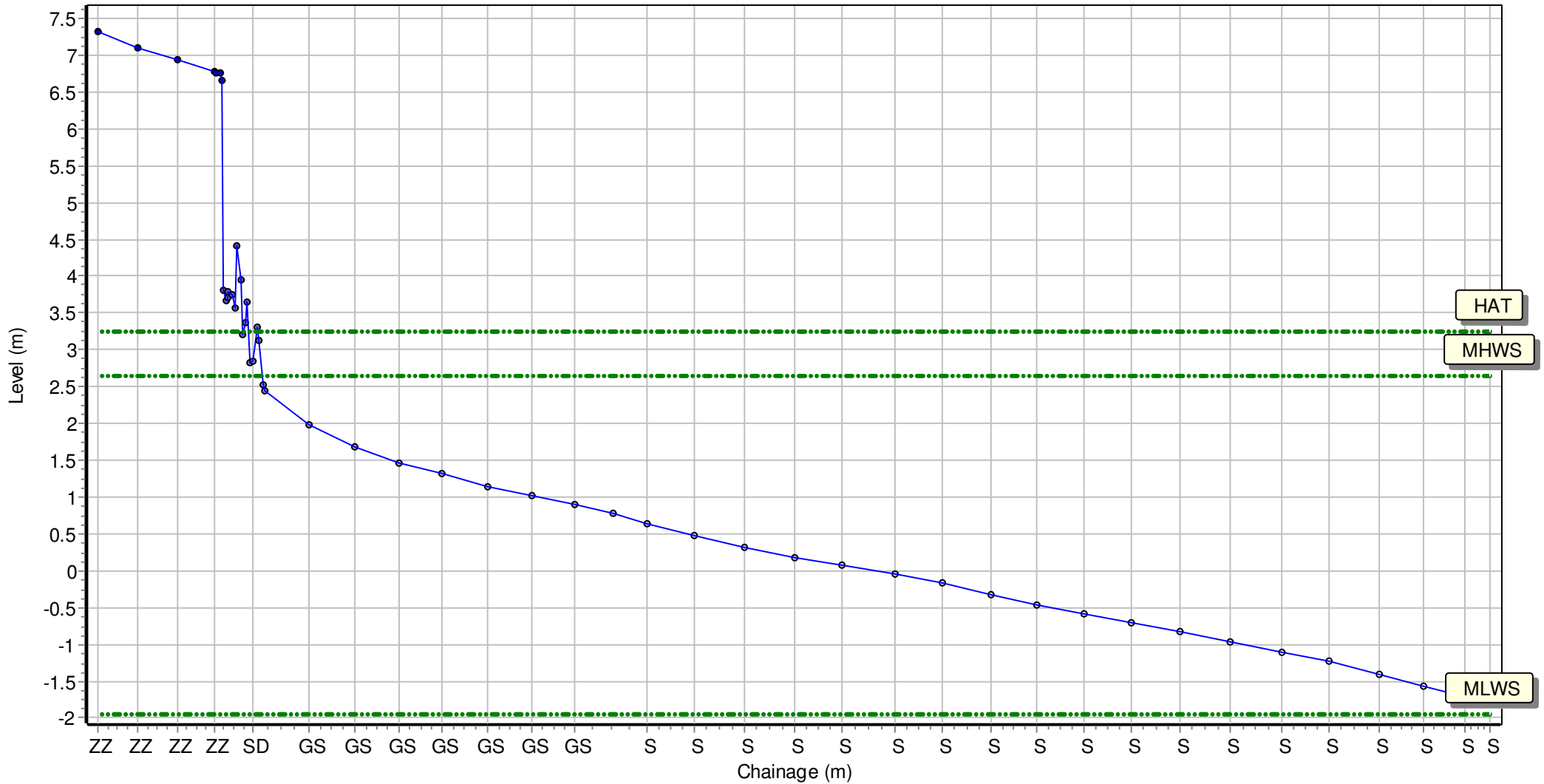
Sea State:

Visibility:

Rain:

Summary: 2018 Partial Measures Topo Survey

Easting: 452517.25 Northing: 530064.57 Profile Bearing: 76 ° from North



Beach Profile

Location: 1cHS4

Date: 07/03/2018

Inspector: AG

Low Tide:

Low Tide Time:

Wind

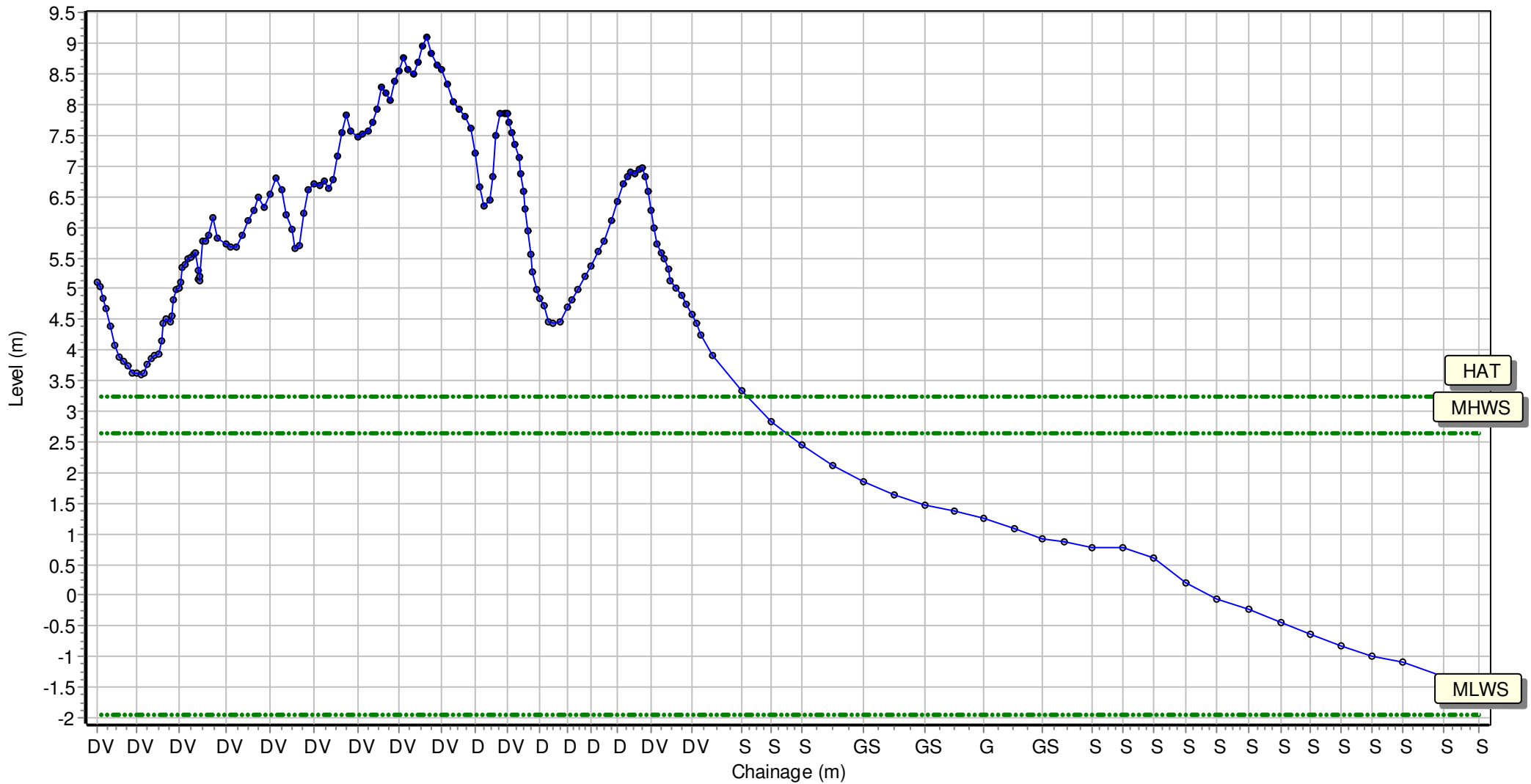
Sea State:

Visibility:

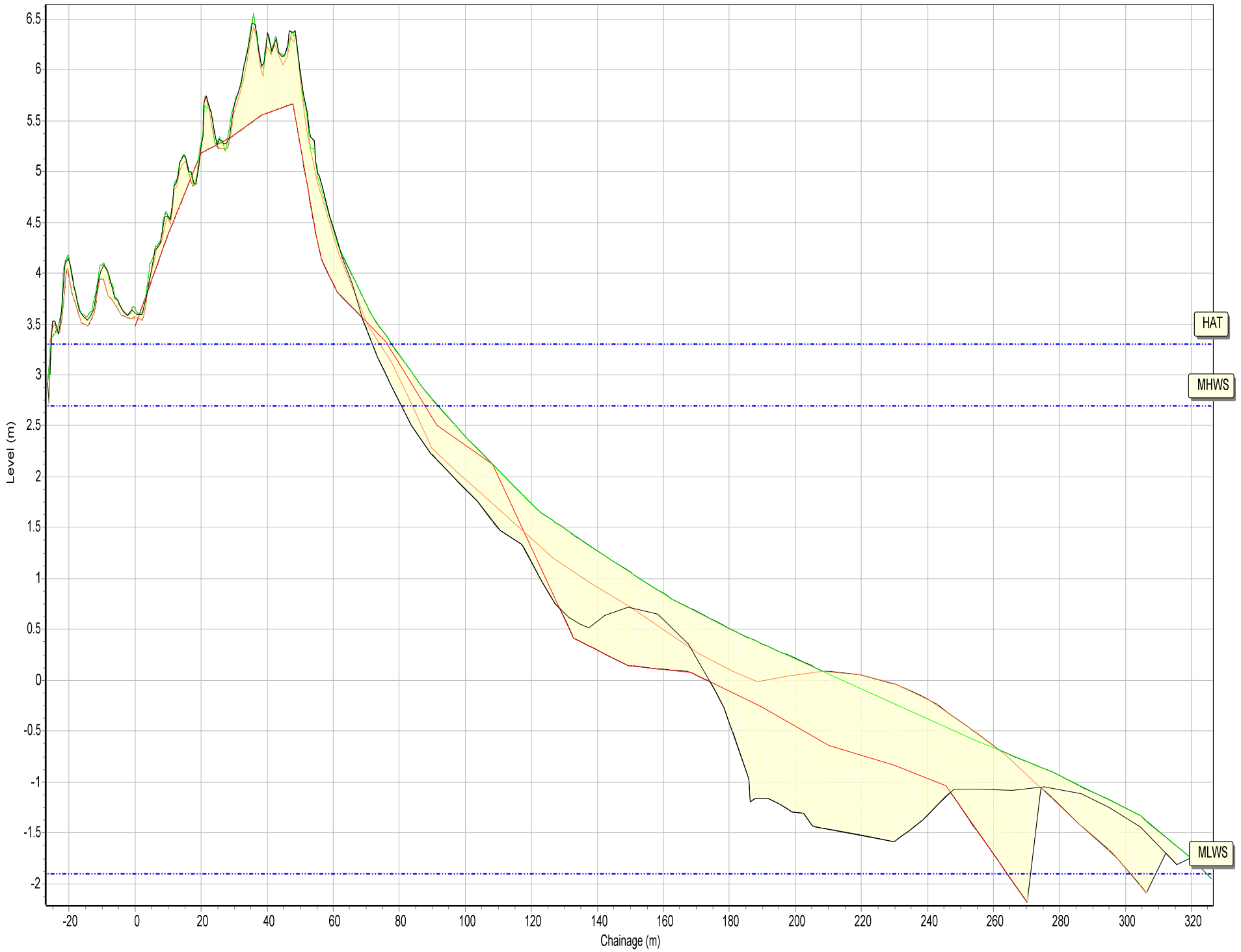
Rain:

Summary: 2018 Partial Measures Topo Survey

Easting: 452889 Northing: 528971 Profile Bearing: 76 ° from North



Beach Profiles: 1cHN1



Profiles Envelope
10/11/2008
01/04/2017
17/11/2017
05/03/2018

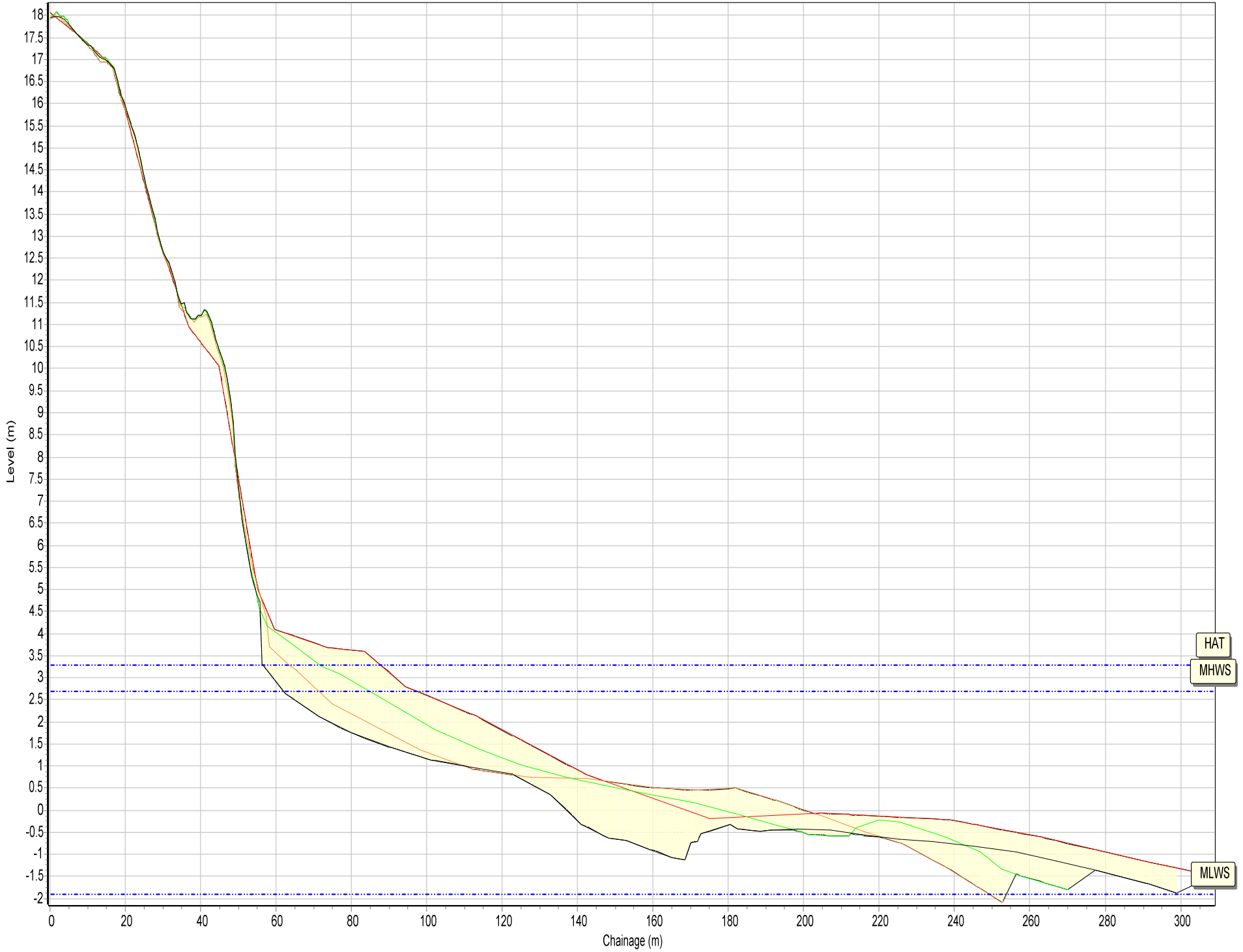
HAT

MHWS

MLWS

SANDS

Beach Profiles: 1cHN2



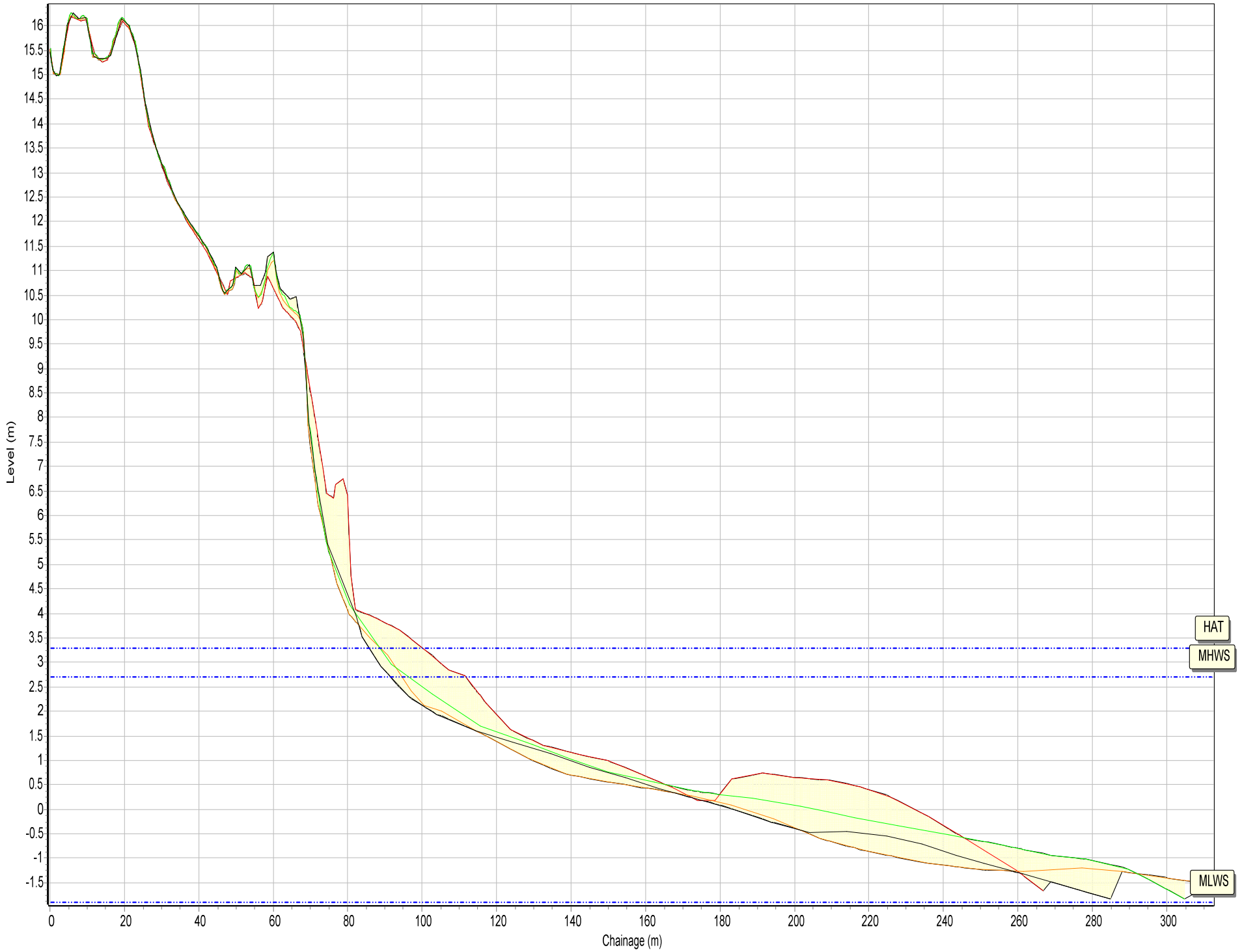
Profiles Envelope
10/11/2008
01/04/2017
17/11/2017
05/03/2018

HAT
MHWS

MLWS

SANDS

Beach Profiles: 1cHN2A



Profiles Envelope
26/03/2012
01/04/2017
17/11/2017
05/03/2018

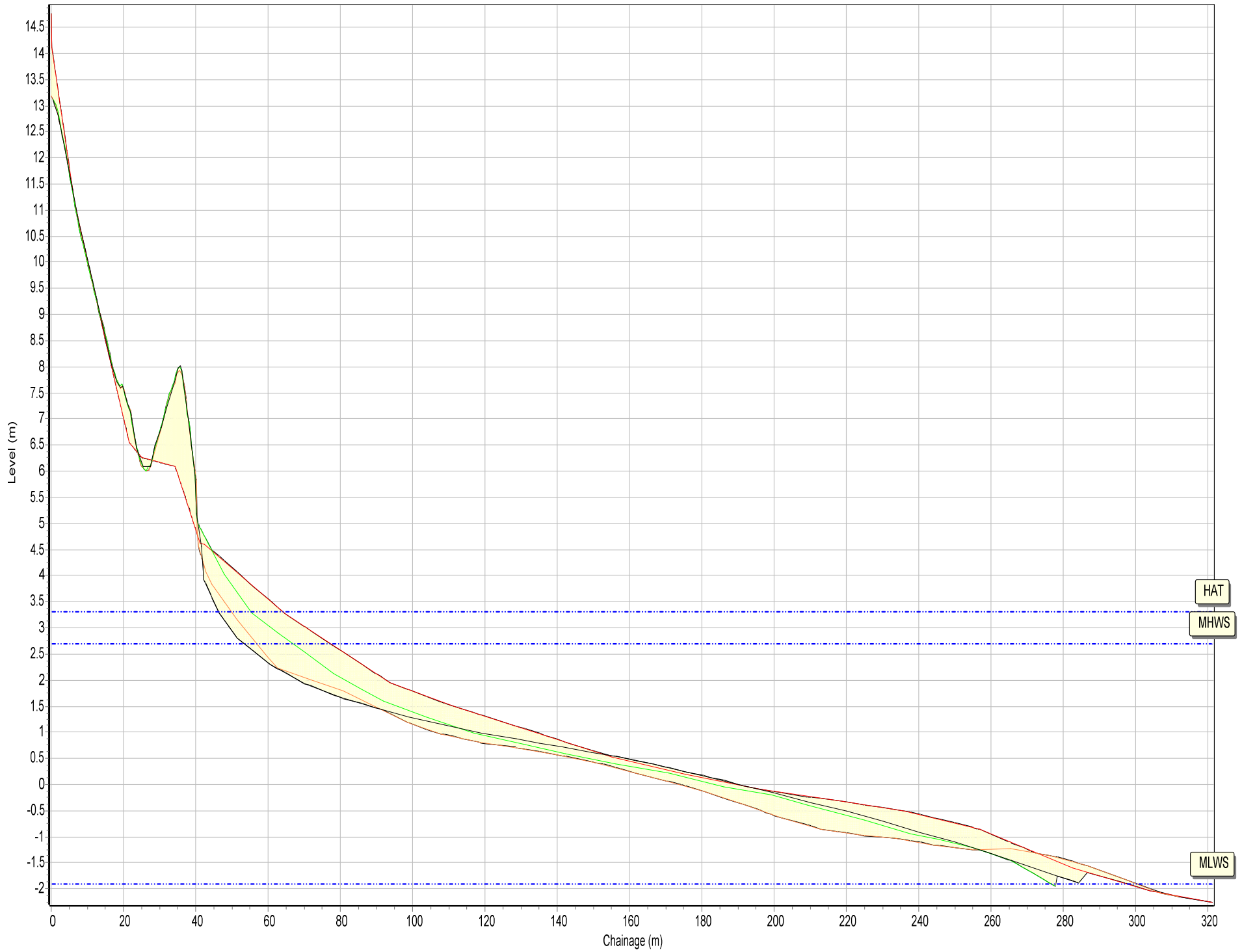
HAT

MHWS

MLWS

SANDS

Beach Profiles: 1cHN3



Profiles Envelope
10/11/2008
01/04/2017
17/11/2017
05/03/2018

HAT

MHWS

MLWS

SANDS

Beach Profiles: 1cHN3A



Profiles Envelope
14/10/2011
01/04/2017
17/11/2017
05/03/2018

HAT

MHWS

MLWS

SANDS

Beach Profiles: 1cHN4



- Profiles Envelope
- 10/11/2008
- 01/04/2017
- 17/11/2017
- 05/03/2018

HAT

MHWS

MLWS

SANDS

Beach Profiles: 1cHN4A



Profiles Envelope
14/10/2011
01/04/2017
17/11/2017
05/03/2018

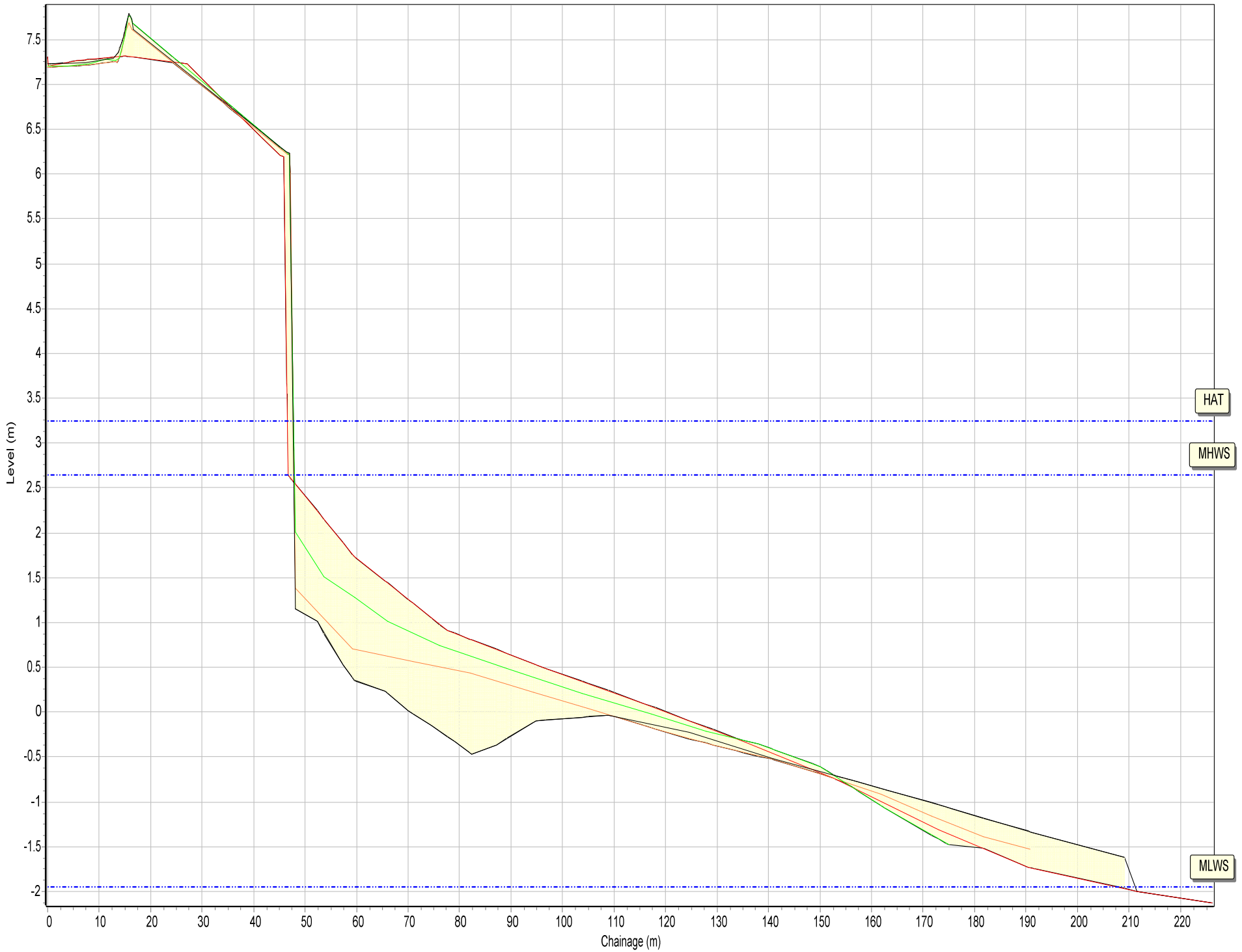
HAT

MHWS

MLWS

SANDS

Beach Profiles: 1cHC1



Profiles Envelope
12/11/2008
02/04/2017
18/09/2017
23/03/2018

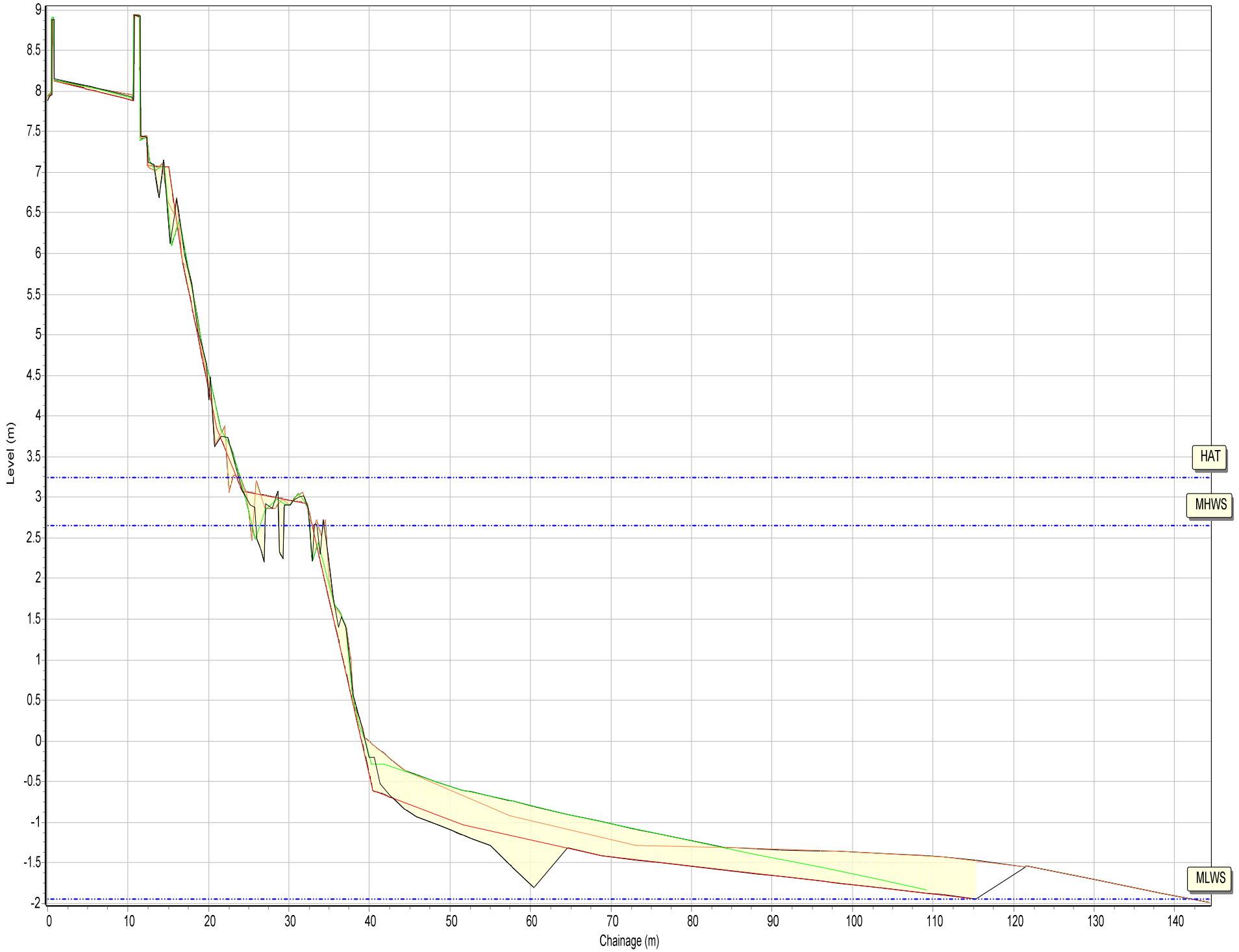
HAT

MHWS

MLWS

SANDS

Beach Profiles: 1cHS1



Profiles Envelope
27/03/2009
02/04/2017
22/11/2017
07/03/2018

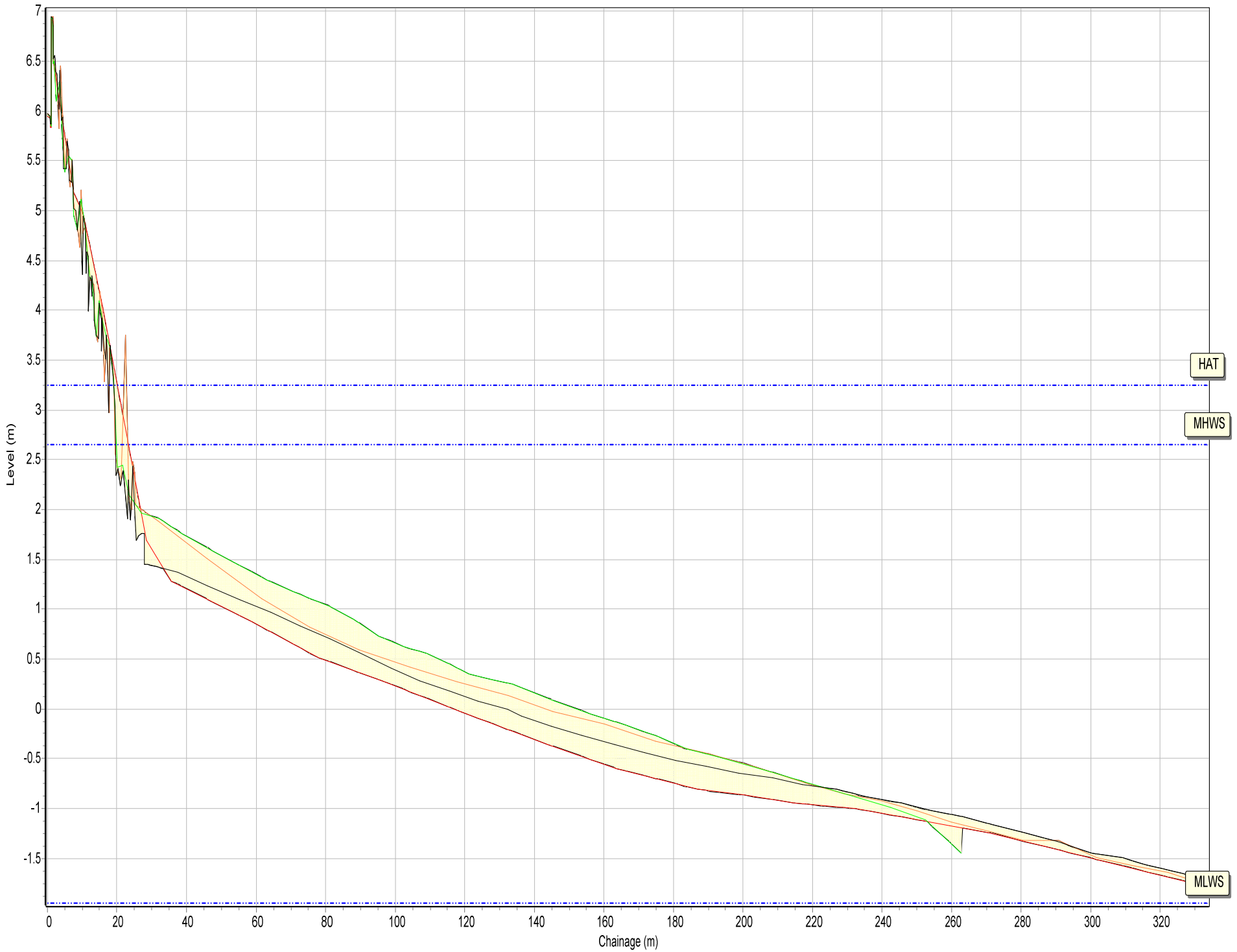
HAT

MHWS

MLWS

SANDS

Beach Profiles: 1cHS2



Profiles Envelope
27/03/2009
02/04/2017
22/11/2017
07/03/2018

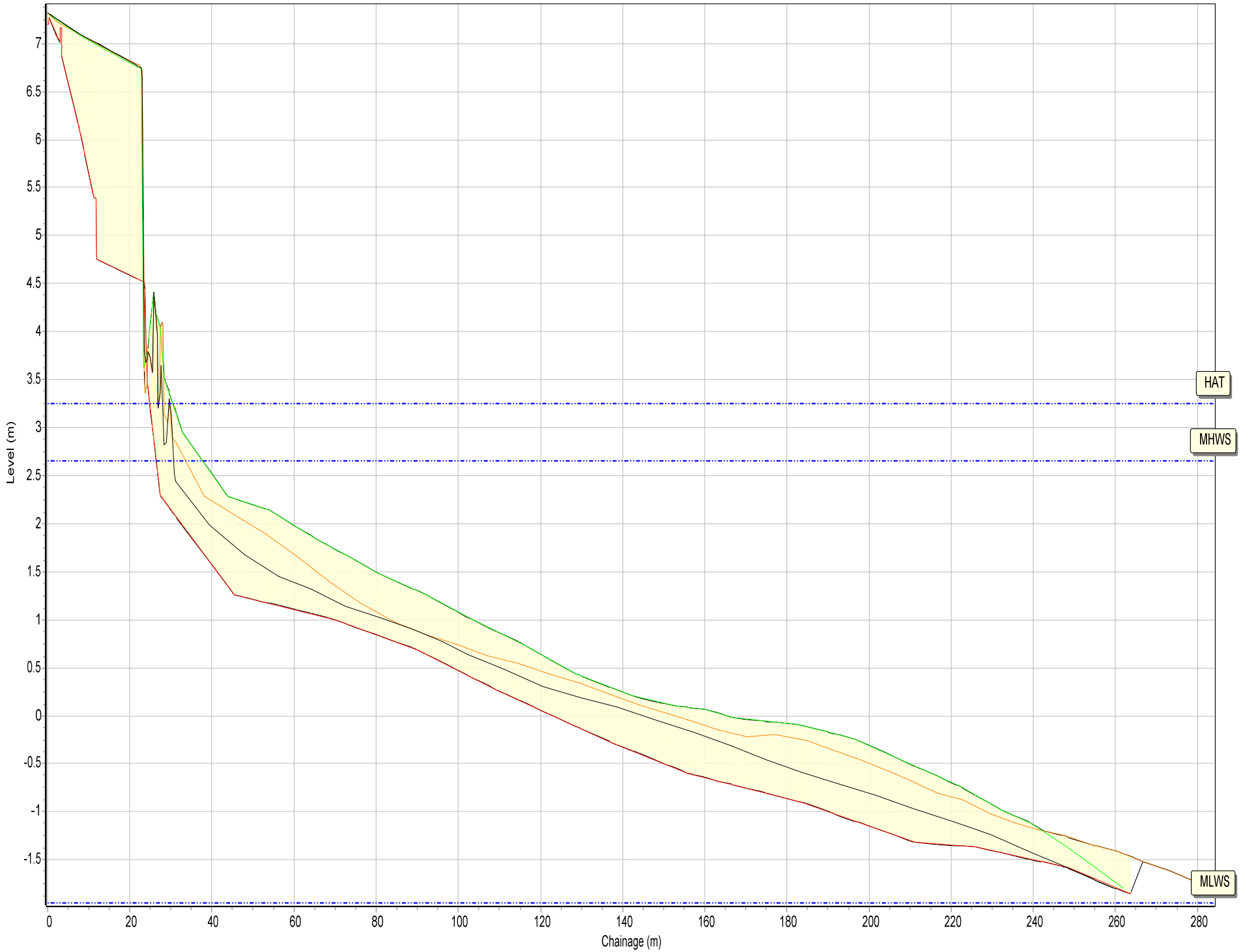
HAT

MHWS

MLWS

SANDS

Beach Profiles: 1cHS3



Profiles Envelope
27/03/2009
02/04/2017
22/11/2017
07/03/2018

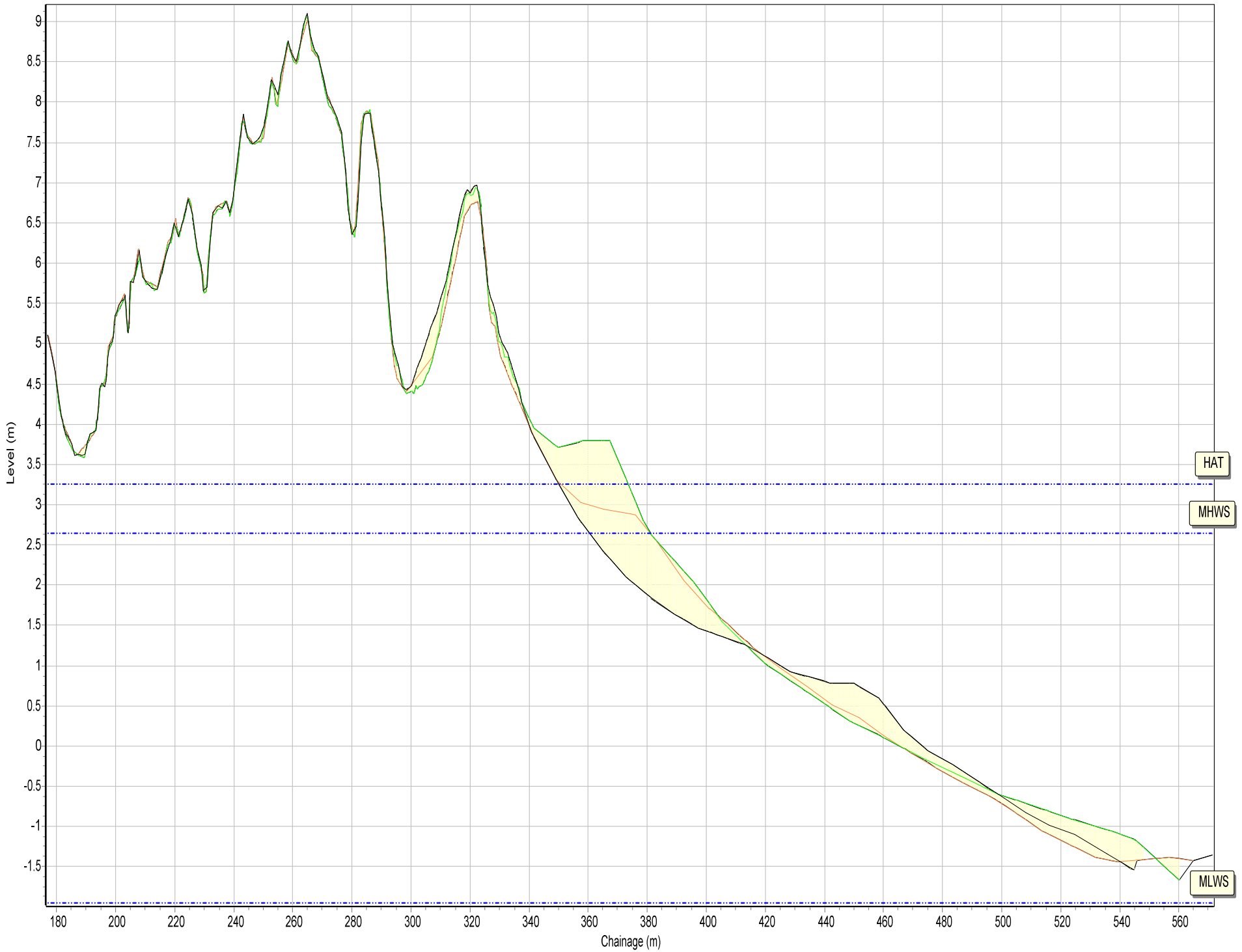
HAT

MHWS

MLWS

SANDS

Beach Profiles: 1cHS4



Profiles Envelope
27/03/2009
02/04/2017
22/11/2017
07/03/2018

HAT

MHWS

MLWS

SANDS