

**Cell 1 Regional Coastal Monitoring Programme  
Update Report 7: 'Partial Measures' Survey 2015**

## 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.....	6
2.1 North Sands .....	6
2.2 Middleton.....	8
2.3 Hartlepool Bay.....	9
3. Problems Encountered and Uncertainty in Analysis.....	10
4. Recommendations for 'Fine-tuning' the Monitoring Programme .....	10
5. Conclusions and Areas of Concern .....	10

## Appendices

Appendix A Beach Profiles

## 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

Authors	
Lily Booth	CH2M
Dr Paul Fish – Review of Draft	CH2M
Dr Paul Fish – Approval of Final	CH2M

## **Disclaimer**

Halcrow Group Limited ('Halcrow') is a CH2M HILL company. Halcrow has prepared this report in accordance with the instructions of our client Scarborough Borough Council (SBC) for the client's sole and specific use. Any other persons who use any information contained herein do so at their own risk. This report is a review of coastal survey information made available by SBC. The objective of this report is to provide an assessment and review of the relevant background documentation and to analyse and interpret the coastal monitoring data. Halcrow has used reasonable skill, care and diligence in the interpretation of data provided to them and accepts no responsibility for the content, quality or accuracy of any Third party reports, monitoring data or further information provided either to them by SBC or, via SBC from a Third party source, for analysis under this term contract.

Raw data analysed in this report is available to download via the project's webpage: [www.northeastcoastalobservatory.org.uk](http://www.northeastcoastalobservatory.org.uk). The North East Coastal Observatory does not "license" the use of images or data or sign license agreements. The North East Coastal Observatory generally has no objection to the reproduction and use of these materials (aerial photography, wave data, beach surveys, bathymetric surveys), subject to the following conditions:

1. North East Coastal Observatory material may not be used to state or imply the endorsement by North East Coastal Observatory or by any North East Coastal Observatory employee of a commercial product, service, or activity, or used in any manner that might mislead.
2. North East Coastal Observatory should be acknowledged as the source of the material in any use of images and data accessed through this website, please state "Image/Data courtesy of North East Coastal Observatory". We recommend that the caption for any image and data published includes our website, so that others can locate or obtain copies when needed. We always appreciate notification of beneficial uses of images and data within your applications. This will help us continue to maintain these freely available services. Send e-mail to [Robin.Siddle@scarborough.gov.uk](mailto:Robin.Siddle@scarborough.gov.uk)
3. It is unlawful to falsely claim copyright or other rights in North East Coastal Observatory material.
4. North East Coastal Observatory shall in no way be liable for any costs, expenses, claims, or demands arising out of the use of North East Coastal Observatory material by a recipient or a recipient's distributees.
5. North East Coastal Observatory does not indemnify nor hold harmless users of North East Coastal Observatory material, nor release such users from copyright infringement, nor grant exclusive use rights with respect to North East Coastal Observatory material.
6. North East Coastal Observatory material is not protected by copyright unless noted (in associated metadata). If copyrighted, permission should be obtained from the copyright owner prior to use. If not copyrighted, North East Coastal Observatory material may be reproduced and distributed without further permission from North East Coastal Observatory.

## 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

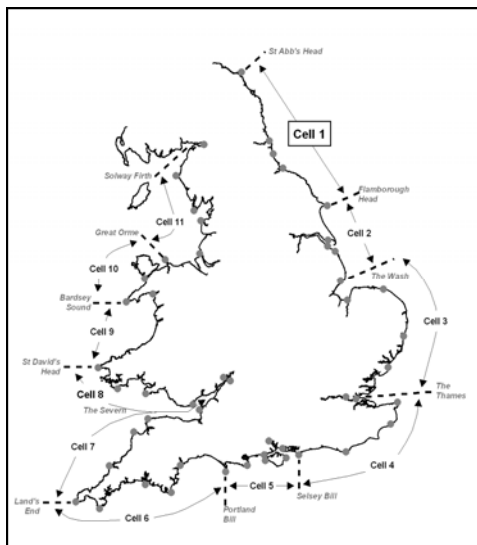
**Source:** *River Tyne to Flamborough Head Shoreline Management Plan 2.*  
Royal Haskoning, February 2007.

## 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	July 10	-
3	2010/11	Aug-Nov 10	Feb 11	Feb-April 11	August 11	Sept 11
4	2011/12	Sep-Oct 11	Oct 12	Mar-May 12	Oct 12	-
5	2012/13	Sep 12	Jan 13	April 13	May 13	-
6	2013/14	Sep-Oct 14	Feb 14	March 13	July 14	-
7	2014/15	Sep-Oct 14	Feb 15	April 15	June 15 (*)	

(\*) The present report is **Update Report 7** and provides an analysis of the 2015 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

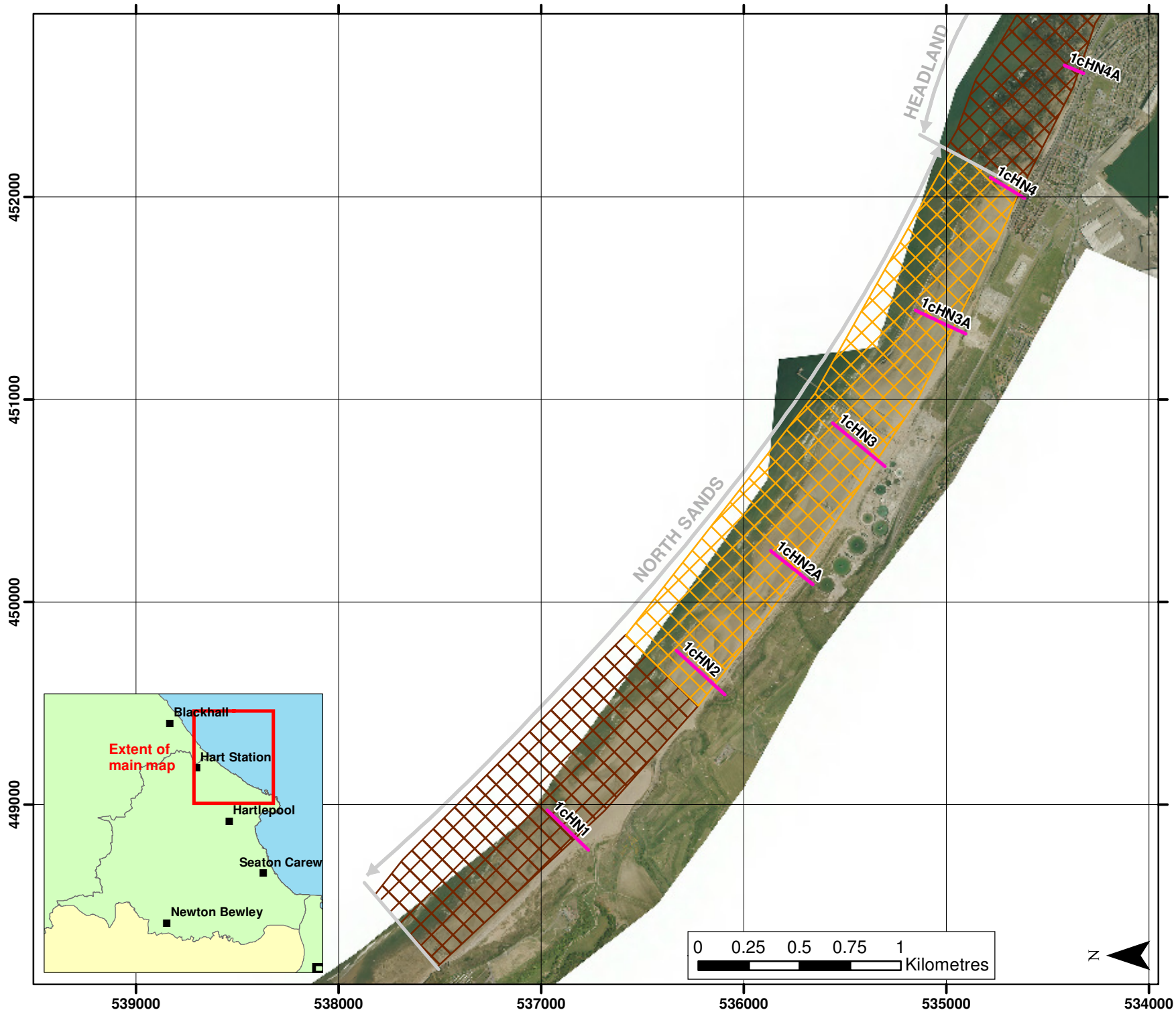
### **1.2 Methodology**

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 between 18<sup>th</sup> and 19<sup>th</sup> April 2015. During this time weather conditions were dry and sunny. The wind was force 1 from the east or south east. The sea state was calm.

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



**KEY**

**Topographic Profiles**

- Annual (Blue line)
- 6 monthly (Pink line)

**Topographic Surveys**

- 6 monthly (Green grid)
- yearly (Yellow grid)
- 5 yearly (Brown grid)

**Cliff Top Monitoring Pegs**

- 50m centres (Purple bar)
- 100m centres (Light Green bar)
- 300m centres (Red bar)

*(Indicative survey extents shown)*

Client: North East Coastal Group  
 Project: Cell 1 Regional Coastal Monitoring Programme 2011 to 2016

**Figure 2 - Map 1**  
**Survey Locations**  
**North Sands**  
**Hartlepool Borough Council**

Update Report 7  
 Partial Measures Survey  
 Spring 2015

**ch2m**<sup>SM</sup>  
 Halcrow Group Ltd, Lyndon House, 62 Hagley Road, Edgbaston, Birmingham, B16 8PE  
 Tel: +44 (0)121 456 2345  
 Fax: +44(0)121 456 1569  
 www.ch2m.com

Photography courtesy of North East Coastal Observatory  
 www.northeastcoastalobservatory.org.uk





**KEY**

**Topographic Profiles**

- Annual (Blue line)
- 6 monthly (Pink line)

**Topographic Surveys**

- 6 monthly (Green grid)
- yearly (Orange grid)
- 5 yearly (Brown grid)

**Cliff Top Monitoring Pegs**

- 50m centres (Purple rectangle)
- 100m centres (Green rectangle)
- 300m centres (Red rectangle)

*(Indicative survey extents shown)*

Client: North East Coastal Group  
 Project: Cell 1 Regional Coastal Monitoring Programme 2011 to 2016

**Figure 2 - Map 2**  
**Survey Locations**  
**Headland and Middleton**  
**Hartlepool Borough**  
**Council**

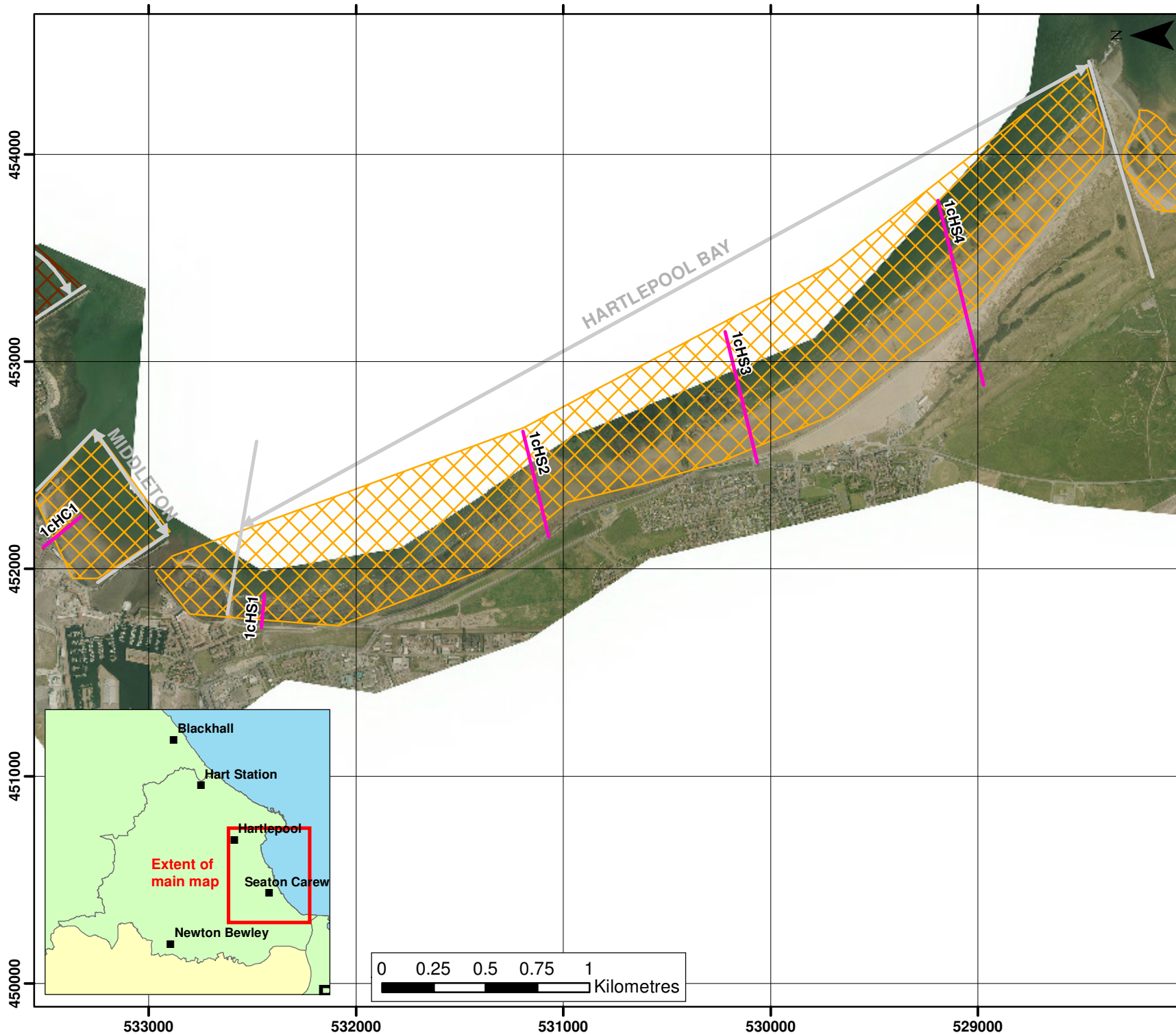
Update Report 7  
 Partial Measures Survey  
 Spring 2015

**ch2m**<sup>SM</sup>

Halcrow Group Ltd, Lyndon House, 62 Hagley Road, Edgbaston, Birmingham, B16 8PE

Tel: +44 (0)121 456 2345  
 Fax: +44(0)121 456 1569  
 www.ch2m.com

Photography courtesy of North East Coastal Observatory  
 www.northeastcoastalobservatory.org.uk



**KEY**

**Topographic Profiles**

- Annual
- 6 monthly

**Topographic Surveys**

- ▨ 6 monthly
- ▨ yearly
- ▨ 5 yearly

**Cliff Top Monitoring Pegs**

- 50m centres
- 100m centres
- 300m centres

*(Indicative survey extents shown)*

Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme 2011 to 2016

**Figure 2- Map 3  
Survey Locations  
Hartlepool Bay  
Hartlepool Borough  
Council**

UpdateReport 7  
Partial Measures Survey  
Spring 2015



Halcrow Group Ltd, Lyndon House, 62 Hagley Road, Edgbaston, Birmingham, B16 8PE

Tel: +44 (0)121 456 2345  
Fax: +44(0)121 456 1569  
www.ch2m.com

Photography courtesy of North East Coastal Observatory  
www.northeastcoastalobservatory.org.uk

## 2. Analysis of Survey Data

### 2.1 North Sands

Survey Date	Description of Changes Since Last Survey	Interpretation
19 <sup>th</sup> April 2015	<p><b>Beach Profiles:</b></p> <p>North Sands is covered by four beach profile lines during the Partial Measures survey (Appendix A) that were last surveyed in September 2012.</p> <p><b>Profile 1cHN1</b> 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. The beginning of the profile between 0m and 70m chainage covers dunes and has not changed. Between 70 and 135m chainage the beach has dropped by up to 0.4m since September 2014. From 135m to 170m chainage the beach level has increased by 0.2m. Between 170m and 215m chainage the beach level has reduced by 0.6m and a ridge has lost. From 215m to 280m chainage the beach level has increased of 0.6m. Together this pattern suggests migration of ridges and runnels towards MLW over the winter of 2014/15.</p> <p>Profile <b>1cHN2</b> covers dune between chainage 0 and 60m. It is stable from 0m to 60m chainage with no change to the dune front since April 2014. In the April 2014, October 2014 and the April 2015 profiles there are two ridges on the beach. The landward ridge is steep sided with an angular top between September 2014 and April 2015 the crest of the ridge had moved seaward and dropped, building out the level of the mid beach. The seaward ridge is often more curved in profile and has moved down the beach to below the MLWS level. The beach has steepened overall since September 2014, leading to an increase of beach level of up to 1.6m on the upper beach and a drop of up to 1.2m the level on the lower beach.</p> <p><b>Profile 1cHN2a</b> was established in October 2011 and runs through the dunes close to North Sands. The areas of dunes to 75m chainage has remained stable since October 2011. At 75m the dune face is stable following the large loss between October 2013 and March 2014. Overall the beach has flattened since September 2014. Between 75m and 160m chainage the level of the beach has increased by 0.5m. Between 160m and 200m chainage a mound has been created in the mid beach due to an increase in beach level of around 0.75m. From 200m chainage to the end of the profile at around 300m</p>	<p>HN1 had two ridges with a runnel in between in both the September 2014 and April 2015 profiles. The beach features had moved seaward over the winter of 2014/15, which suggests typical winter beach draw down.</p> <p>The toe of the dune in profiles HN2, 2a and 3a had been subject to large loss between October 2013 and March 2014, but since March 2014 the dune front has remained stable.</p> <p>The beach at profiles HN3 and HN3a are flat and close to the middle of the range of previous profiles. In contrast, HN4 and HN4a profiles are low with rock exposed for much of the seaward half of both profiles.</p> <p><b>Longer term trends:</b></p> <p>Following dune erosion over the winter of 2013/14 the upper beach has remained stable. There has been erosion at the toe of the defence at HN4. 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>chainage the beach level has dropped by around 1m since September 2014.</p> <p>At <b>Profile 1cHN3</b> there has been little change of the dunes and the foredune at 35m chainage, has remained stable. From 50m to 110m chainage there is very little change with the level staying within 0.25m of the September 2014 level. From 110 to 240m the beach level has dropped by up to 0.5m. For the remainder of the profile between 240 and 280m chainage the lower beach has remained stable. Overall the profile shows very little change.</p> <p>At <b>Profile 1cHN3a</b> the dune front at 18m chainage has remained stable since March 2014. Overall the beach has steepened, Between 20 and 60m chainage the beach level has risen by 0.5m. From 60m to 120m chainage there has been little change. From 120m to 180m chainage the beach level has dropped by 0.5m.</p> <p><b>Profile 1cHN4</b> shows little change in the defended part of the profile. At 15m chainage the level of the beach where it meets the sea wall has been progressively lowering since the profiles began in October 2008. The April 2015 profile is the lowest the base of the seawall and it has eroded by 0.5m since September 2014. Between 20m and 60m chainage there has been very little difference in the beach profile since September 2014. From 60m to 110m chainage the beach level has dropped by 0.5m over the winter of 2014/15. At the bottom of the profile the rocks are clearly exposed on the shore.</p> <p><b>Profile 1cHN4a</b> was established in October 2011. The defended part of the profile to 10m chainage has not changed since October 2011. The shore platform is exposed for much of the survey, which is due to a 0.8m drop in beach level which occurred between September 2012 and April 2013.</p>	

## 2.2 Middleton

Survey Date	Description of Changes Since Last Survey	Interpretation
18 <sup>th</sup> April 2015	<p><b>Beach Profiles:</b></p> <p>Middleton is covered by one beach profile line during the Partial Measures survey (Appendix A). The profile was last surveyed in September 2014.</p> <p><b>Profile 1cHC1</b> shows little change in beach level, although it has slightly steepened overall. The top of the beach between 50m and 80m chainage accreted by 0.5m since September 2014. Between 80m and 120m chainage there has been little change in beach level. From 120m to 170m change the beach has eroded by 0.25m. From 170m chainage to the extent of the survey at 190m there is little difference in the beach level.</p>	<p>The upper part of the beach was high compared to historical levels, but the seaward part of the beach is among the lowest recorded. As a result the beach is very steep, this is likely to be due to a winter dominated by waves with a strong swash component.</p> <p><b>Longer term trends:</b> 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 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
18 <sup>th</sup> April 2015	<p><b>Beach Profiles:</b></p> <p>Hartlepool Bay is covered by four beach profile lines during the Partial Measures survey (Appendix A).</p> <p><b>Profile 1cHS1</b> 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 wall, since September 2014. Beyond 40m, the March 2015 profile is the highest on record. At 40m chainage the beach level is near the highest recorded and since October 2014 the beach level has also increased by up to 0.5m between 40m and 80m chainage to exceed past levels. Beyond 80m chainage to the end of the profile at 120m chainage the profile has changed very little.</p> <p><b>Profile 1cHS2</b> shows limited differences between the September 2014 and April 2015 surveys. The profile overall has steepened and is near the highest recorded. The beach between 20 and 200m chainage has remained stable. Beyond 200m chainage the beach dropped by 0.2m since October 2015.</p> <p><b>Profile 1cHS3</b> shows no changes between the start of the survey and 30m chainage between October 2014 and April 2015. From 30m to 60m chainage the beach level has increased by 0.2m since October. Between 60m and 160m chainage there has been minimal change of less than 0.2m. From 160m to the end of the survey at 260m chainage the beach level has increased by 0.4m over the winter of 2014/15. The beach profile is high compared to the previous profiles.</p> <p><b>Profile 1cHS4</b> 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 is deepening. The photographs suggesting lowering may result from footpath erosion. The crest of the foredune at 320m chainage has increased in height by 0.1m since October 2014 and 0.3m since March 2014. There is no change in the beach between 320 and 360m chainage. At 360m chainage there was a ridge of beach material above the HAT level in the March and October profiles, by April 2015 the ridge had been lost (a drop of 0.2m). From MHWS at about 390m to the end of the profile at MLWS at 580m chainage the beach has altered very little with limited accretion up to 0.2m since October 2014.</p>	<p>In April 2015 profiles HS1 and HS2 were at or near their highest level and were very steep. HS3 is also high but the gradient is similar to previous profiles. HS4 is very steep so the upper beach is among the highest of the profiles and the lower part of the beach has dropped. There profiles were very smooth with few bars or runnels.</p> <p>The dunes at 1cHS4 are in good condition. The foredune continues to accrete but erosion associated with a walkway is causing localised lowering that may affect stability of the wider dune system in the long term.</p> <p><b>Longer term trends:</b> Beach levels within Hartlepool Bay in April 2015 were amongst the highest recorded in comparison to previous surveys. The beach levels have been progressively increasing across the bay. The steepening of the beach is likely to be due to the swash dominated conditions during the winter of 2014/15.</p>

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

#### **Individual Profiles**

No problems are reported in the survey report.

### **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 beach had two ridges in September 2014 which appear to have been drawn down over the winter of 2014/15, showing seasonal variation in the beach. Since March 2014 the front of the dune in profiles HN2, 2a and 3a has remained stable. The toe of the dune in these locations had been subject to large loss between October 2013 and March 2014. In the middle of this section (profiles HN3 and HN3a) the beach is flat and close to the middle of the range of previous profiles. In the South (profiles HN4 and HN4a) the beach level is low with rock exposed for much of the seaward half of both profiles.
- At Middleton the beach is very steep. The upper part of the beach was reasonably high, but the seaward part of the beach is among the lowest recorded. The cause could be a winter dominated by waves with a strong swash component.
- Hartlepool Bay has been subject to further accretion and steepening of the beach. All of the profiles are flat, with no bars or ridges. The dunes at the southern end of the bay are stable but people walking over them may affect their stability long term.

## **Appendices**

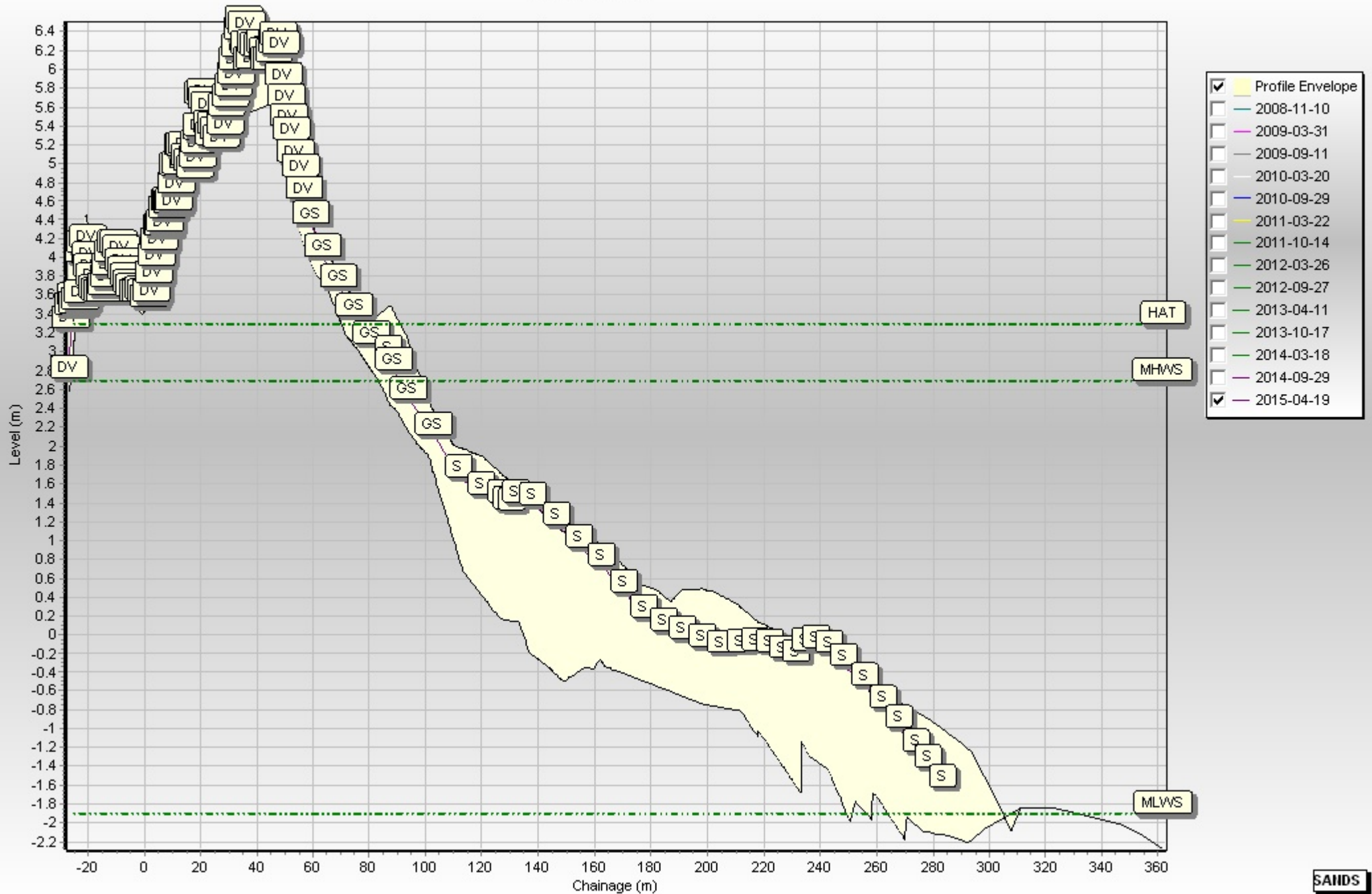


**Appendix A**  
**Beach Profiles**

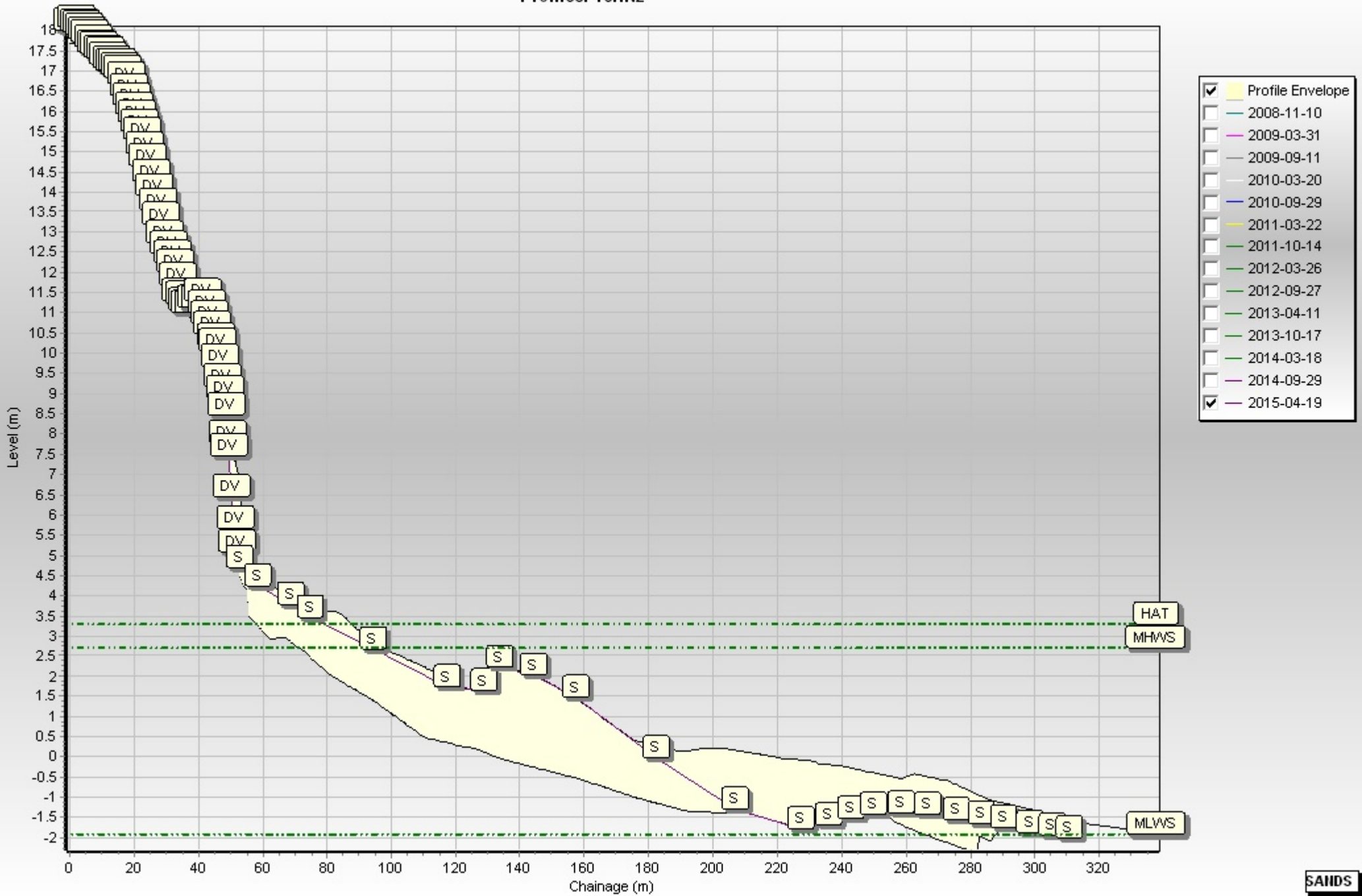
The following sediment feature codes are used on some profile plots:

<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

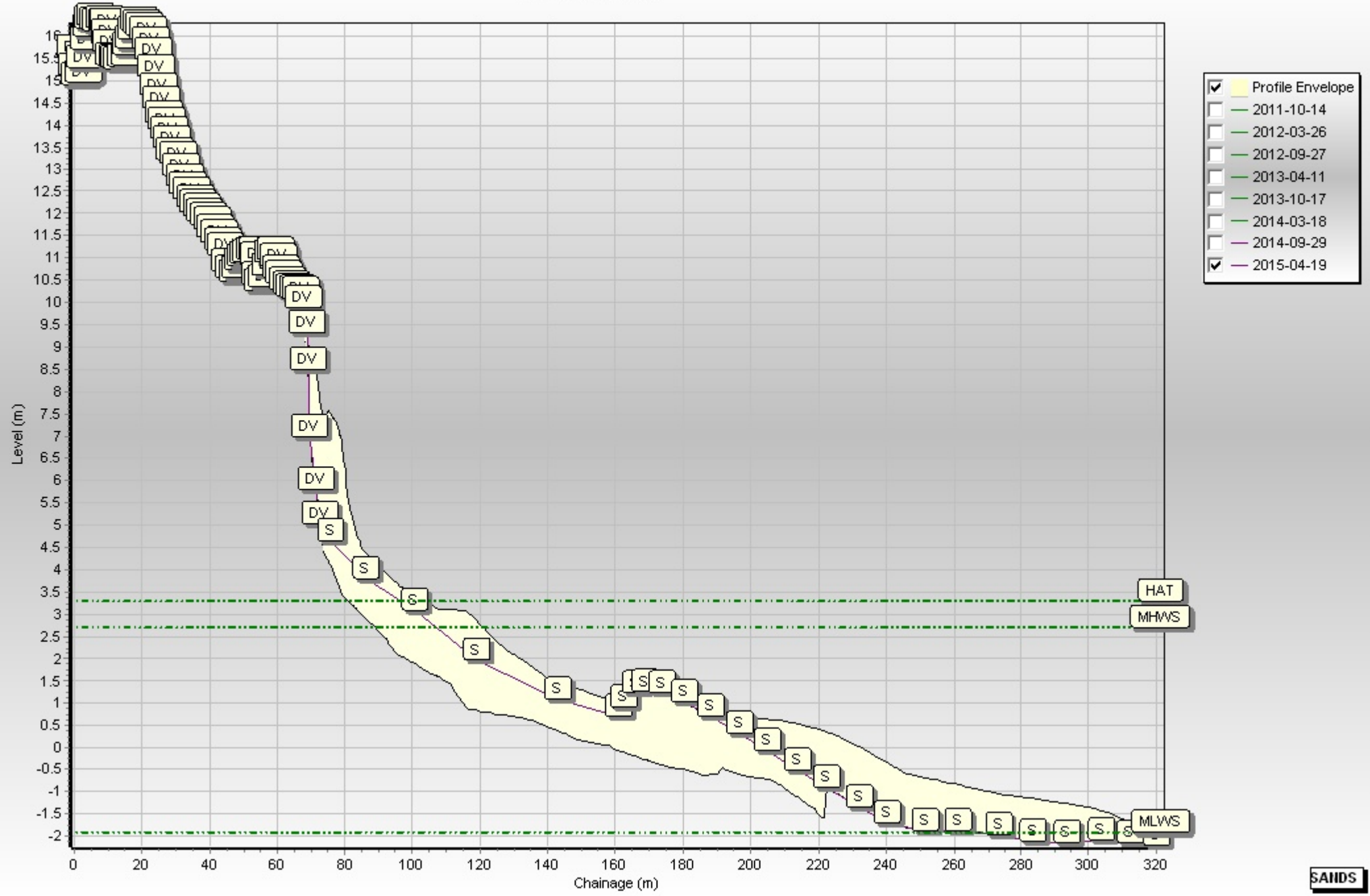
### Profiles: 1cHN1



Profiles: 1cHN2



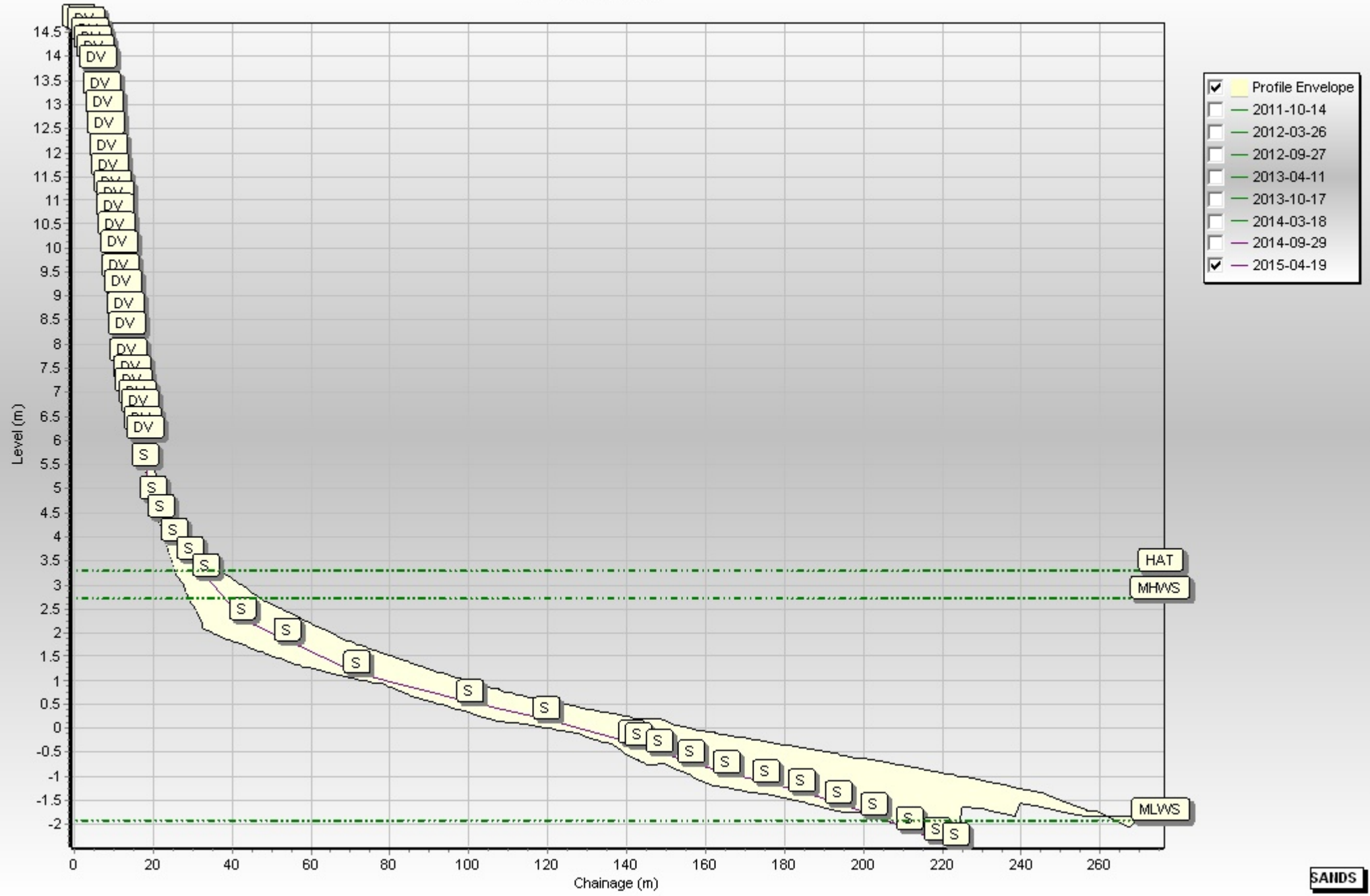
Profiles: 1cHN2A



Profiles: 1cHN3

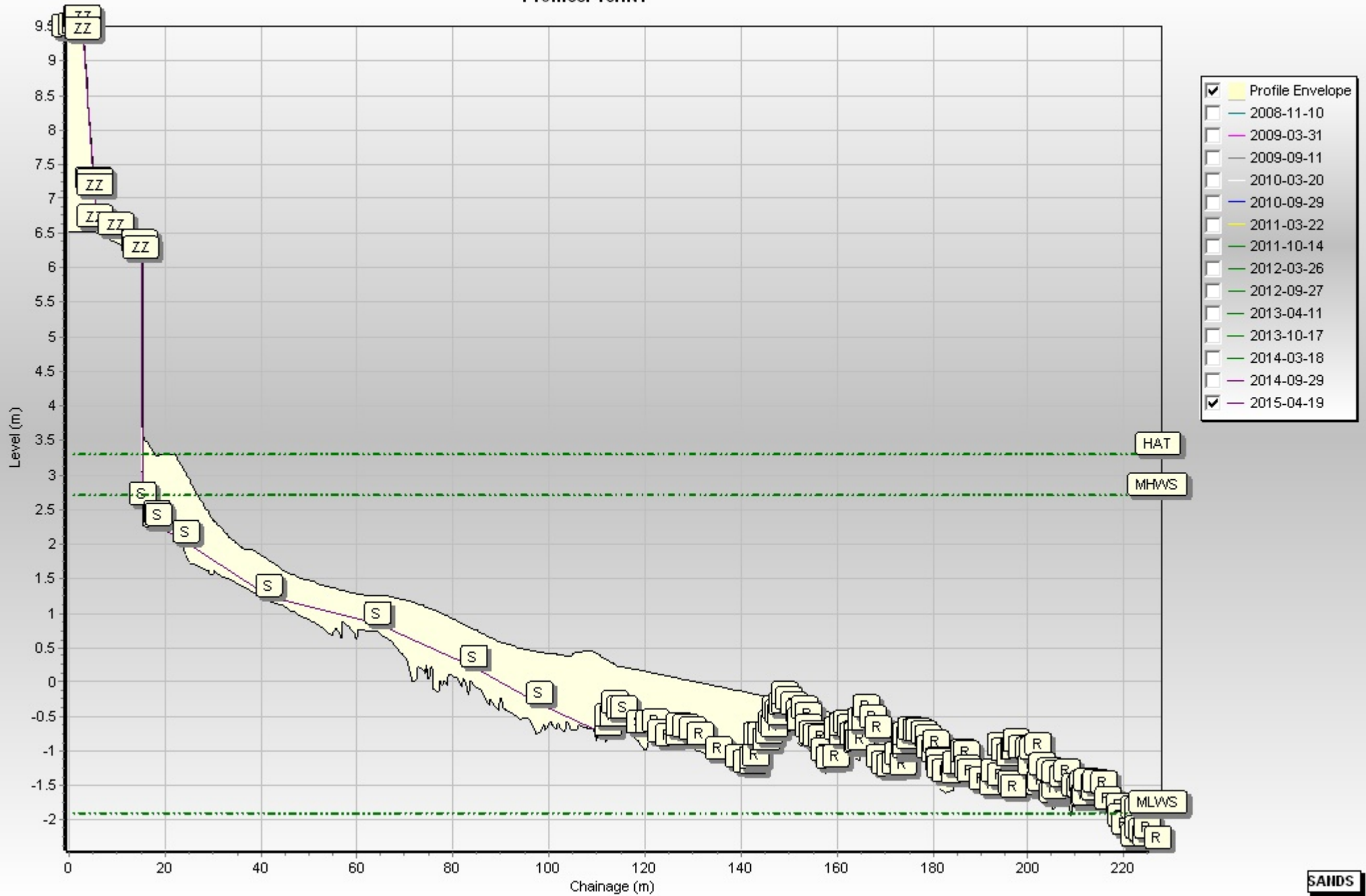


Profiles: 1cHN3A



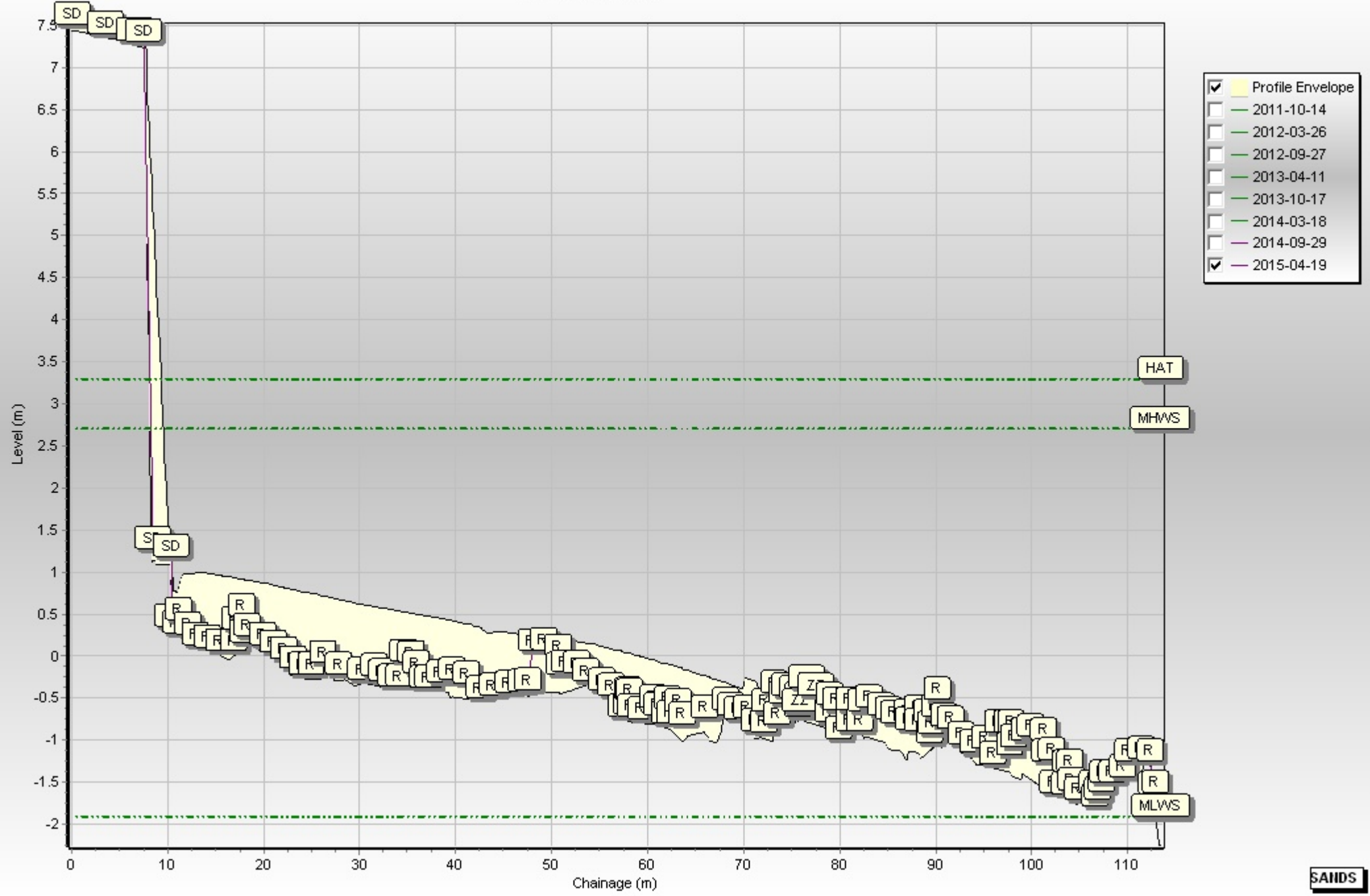


### Profiles: 1cHN4

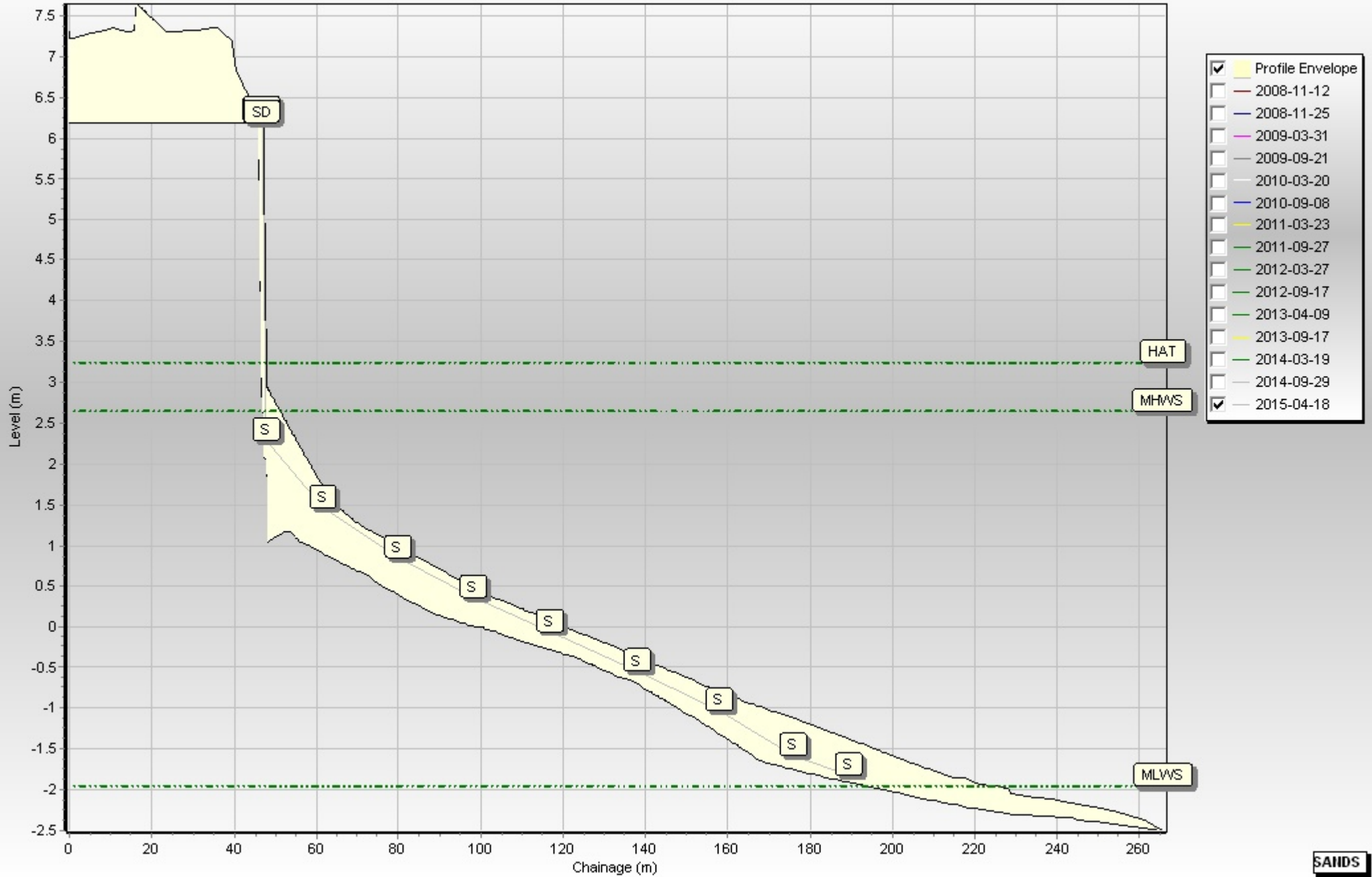




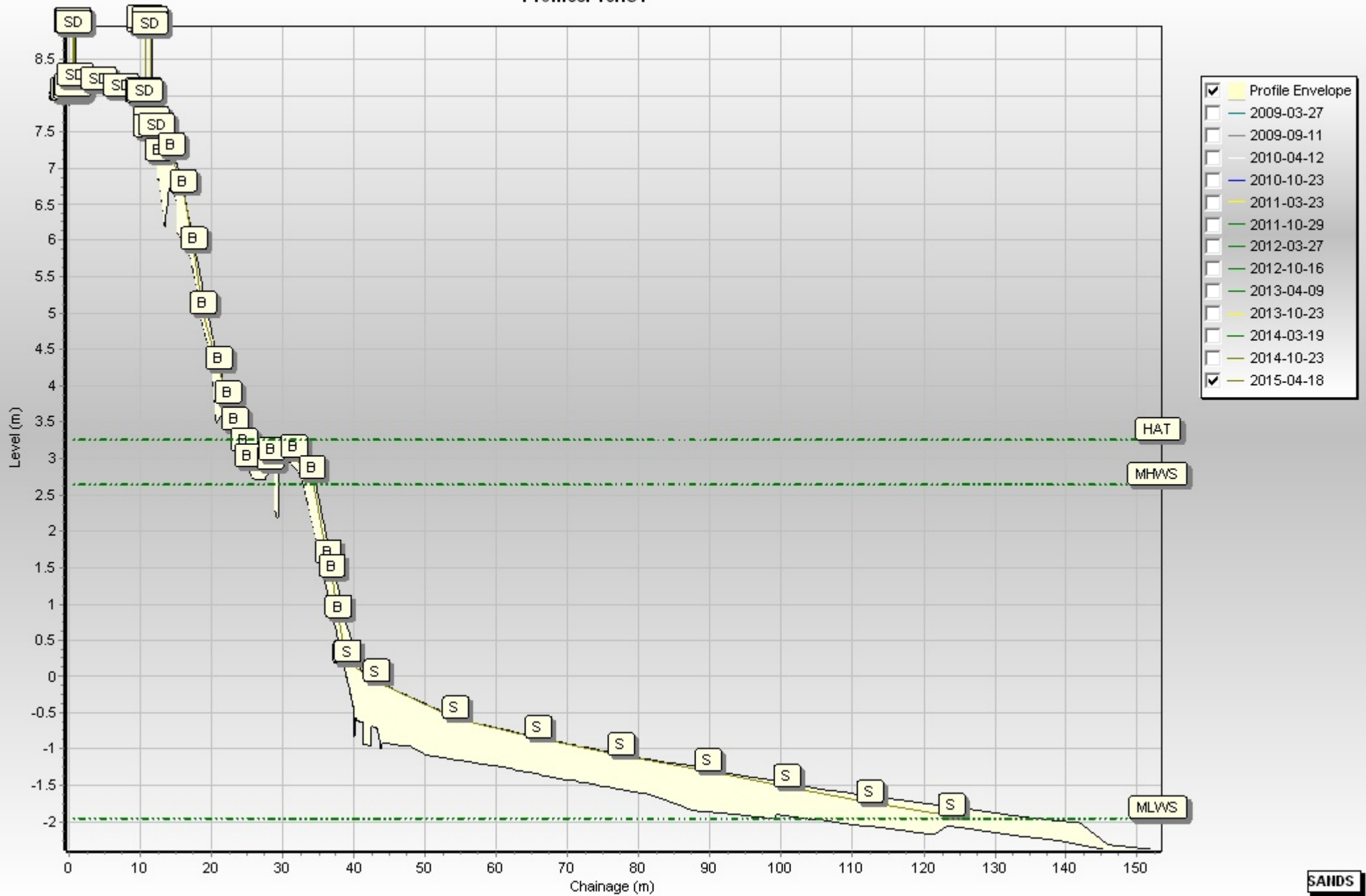
Profiles: 1cHN4A



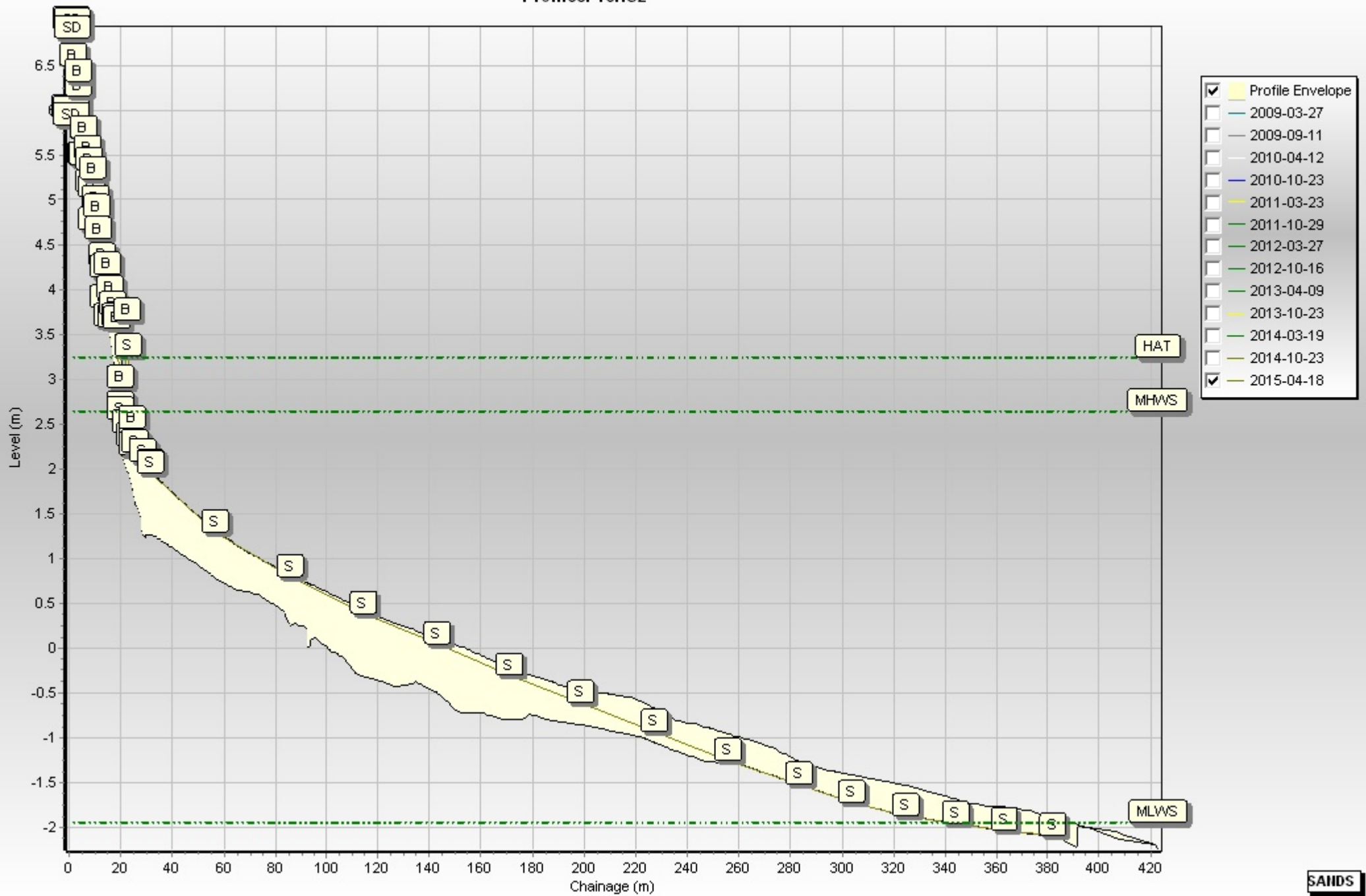
Profiles: 1cHC1



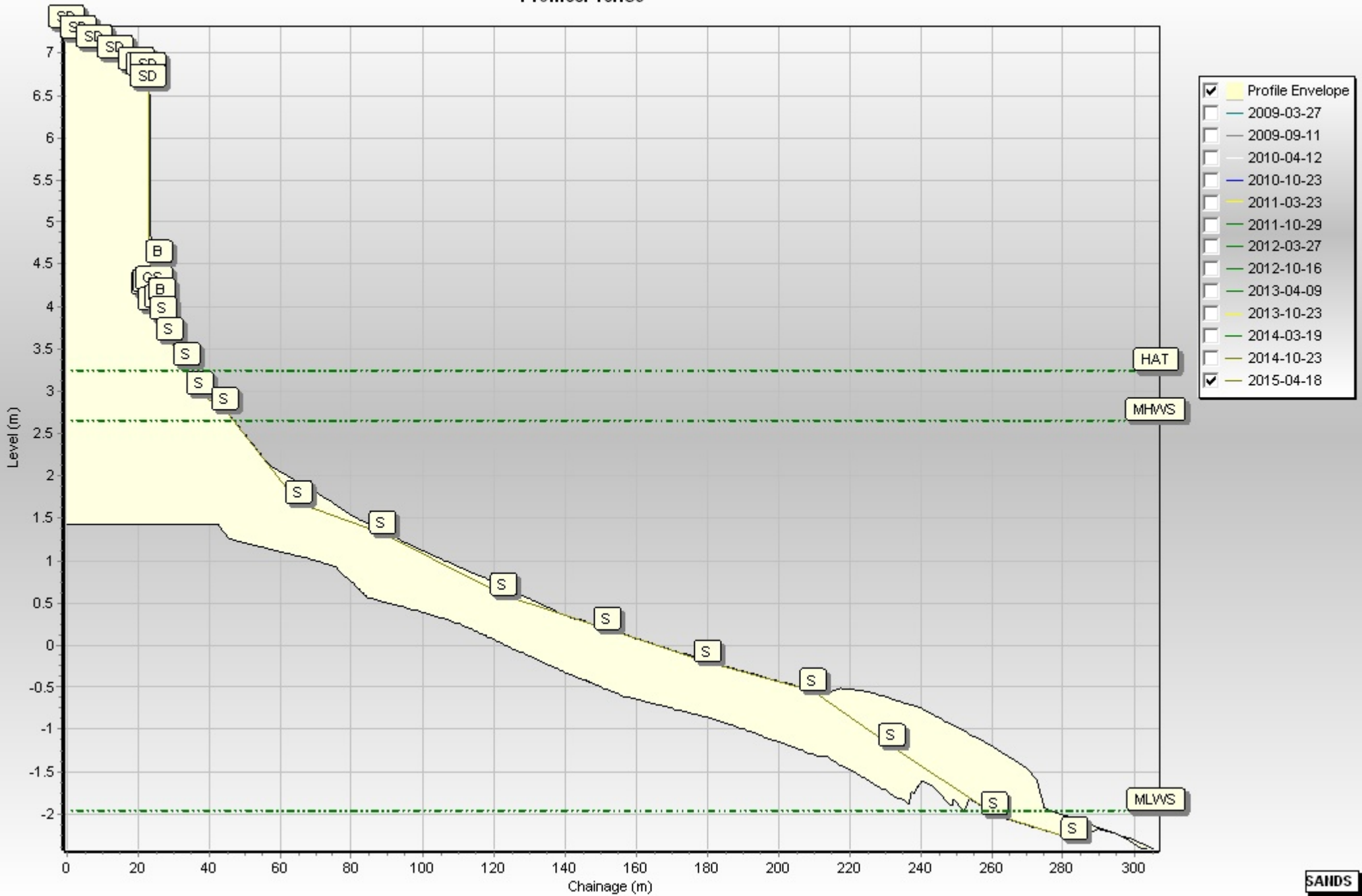
Profiles: 1cHS1



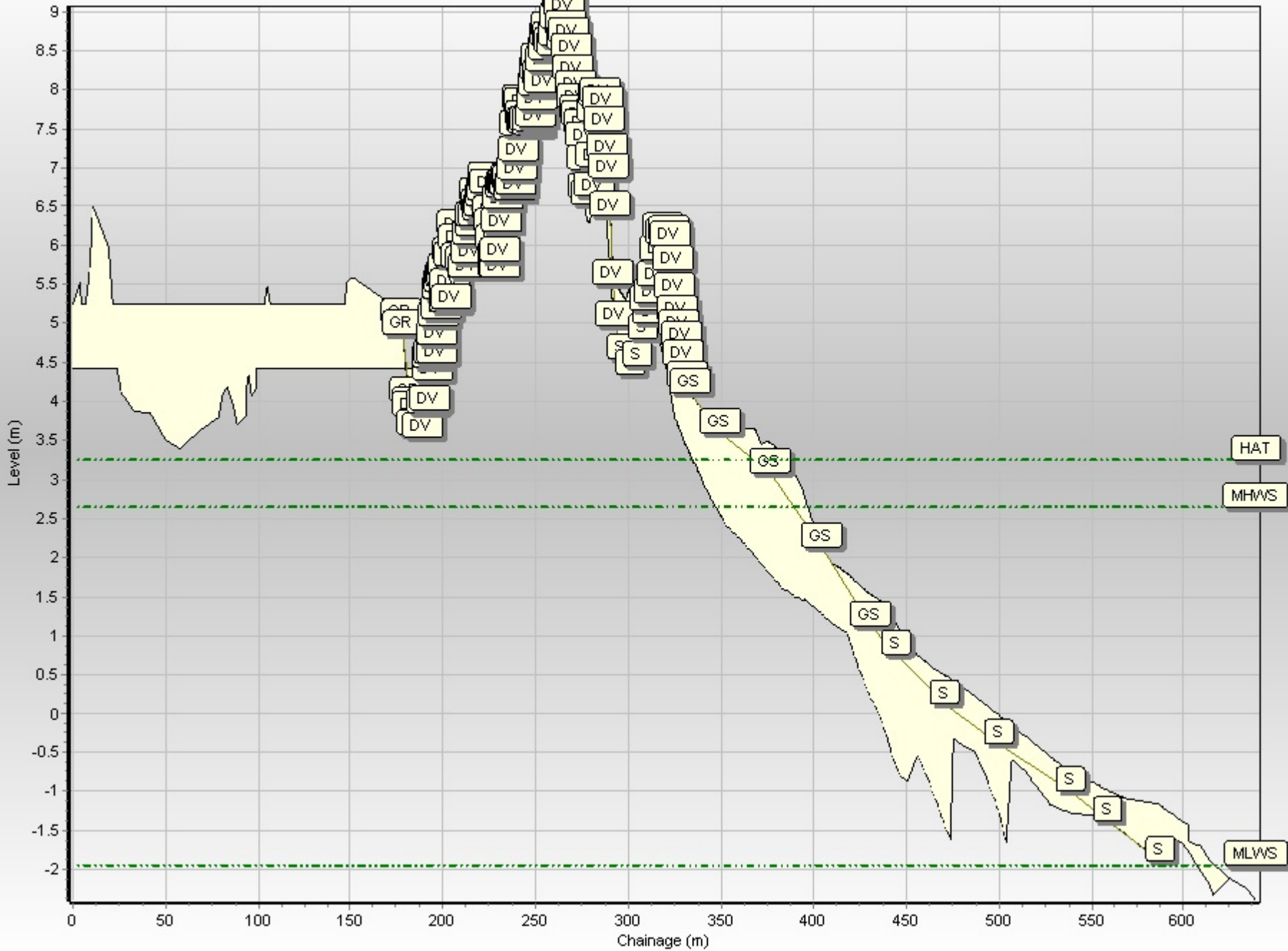
Profiles: 1cHS2



Profiles: 1cHS3



Profiles: 1cHS4



- Profile Envelope
- 2009-03-27
- 2009-09-11
- 2010-04-12
- 2010-10-23
- 2011-03-23
- 2011-10-29
- 2012-03-27
- 2012-10-16
- 2013-04-09
- 2013-10-23
- 2014-03-19
- 2014-10-23
- 2015-04-18