

UK Coastal Monitoring and Forecasting

2015 Annual Report for the UK National Tide Gauge Network



**British Oceanographic
Data Centre**
NATURAL ENVIRONMENT RESEARCH COUNCIL



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NATURAL ENVIRONMENT RESEARCH COUNCIL

UK Coastal Monitoring and Forecasting: Annual Report for 2015 for the UK National Tide Gauge Network

Contributors to the Annual Report

Paul McGarrigle, BODC	Editor
Elizabeth Bradshaw, BODC	BODC Sea Level Data Manager
Les Bradley, NOC	Instrument documentation and site information
Geoff Hargreaves, NOC	Tide Gauge Engineer
Libby Macleod, BODC	Tide Gauge Data Sets
Colin Bell, NOC	Tide Gauge Data Products
Angela Hibbert, NOC	Tide Gauge Data Products
Richard Downer, BODC	Web Development and Management
Kevin Horsburgh, NOC	Operational Tide-Surge Models
Jane Williams, NOC	Operational Tide-Surge Models
Lesley Rickards, BODC/PSMSL	Director of PSMSL

BODC	British Oceanographic Data Centre
NOC	National Oceanography Centre
PSMSL	Permanent Service for Mean Sea Level

Thanks also to all those involved in maintenance of the network, data retrieval, processing, quality control and delivery.

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Contents

Foreword	5
Tide Gauge Instruments	6
Data Processing	7
Calculating Statistics	10
UK Tide Gauge Network Map	11
UK Tide Gauge Data Completeness (%), January to December 2015	12
UK Tide Gauge Data Quality (%), January to March 2015	13
UK Tide Gauge Data Quality (%), April to June 2015	14
UK Tide Gauge Data Quality (%), July to September 2015	15
UK Tide Gauge Data Quality (%), October to December 2015	16
Requests to BODC for UKCMF Data in 2015, Data Downloads	17
Requests to BODC for UKCMF Data in 2015 by User Category	18
Aberdeen	19
Avonmouth Portbury	22
Bangor	25
Barmouth	28
Bournemouth	31
Cromer	34
Dover	37
Fishguard	40
Harwich	43
Heysham	46
Hinkley Point	49
Holyhead	52
Ilfracombe	55
Immingham	58
Isle of Islay (Port Ellen)	61
Isle of Man (Port Erin)	64
Jersey (St Helier)	67
Kinlochbervie	70
Leith	73
Lerwick	76

Liverpool	79
Llandudno	82
Lowestoft	85
Milford Haven	88
Millport	91
Mumbles	94
Newhaven	97
Newlyn	100
Newport	103
North Shields	106
Plymouth Devonport	109
Portpatrick	112
Portrush	115
Portsmouth	118
Sheerness	121
St Mary's (Isles of Scilly)	124
Stornoway	127
Tobermory	130
Ullapool	133
Weymouth	136
Whitby	139
Wick	142
Workington	145

Foreword

UK Coastal Monitoring and Forecasting (UKCMF) is a partnership between the Environment Agency, Scottish Environment Protection Agency, Natural Resources Wales and Rivers Agency Northern Ireland. Working in partnership, we define the standards and performance for coastal flood forecasting and monitoring for the UK. We use the same strategic coastal models and data sources as inputs to locally developed systems to provide the operational flood forecasting and monitoring service within each of our national boundaries.

Central to UKCMF is the UK strategic Tide Gauge Network. This network consists of 43 strategically important tide gauges that continually record sea level around the UK coastline. The gauges primary use is in operational coastal flood forecasting but they also provide important data for a variety of other uses such as long-term sea level monitoring studies.

The data from the network is Quality Controlled and archived by British Oceanographic Data Centre from where it is freely available
(https://www.bodc.ac.uk/data/online_delivery/nts1f)

BODC work with UKCMF ensuring that data from our strategic tide gauge network is checked and archived to a common internationally recognised standard and that the archive record is easily accessible for all those that want to use it.

This annual report for 2015 explains the data management and quality control processes undertaken, gives details and maps of the location of each gauge, and statistics of the data at each site. The statistics include a monthly summary of the data completeness and quality throughout the year for each site. Also included is a summary of data downloads from the website for the entire UKCMF gauge network. I hope you find it both interesting and useful.

Liz Anspoks
Environment Agency Flood Detection and Forecasting Manager
UKCMF Leadership Group Chair

Tide Gauge Instruments

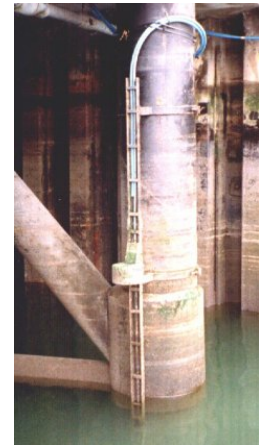
Full-tide Bubbler

The full tide bubbler system normally consists of two independent measuring systems. The pressure points are mounted approx 1m below Admiralty Chart Datum (ACD) so that negative surges can be recorded. The pressure points visible underwater in the photograph resemble an inverted bucket with a copper nozzle mounted on the side. This nozzle is the actual measuring point. A low flow of dry air (normally 7ml/min) is fed down an air tube to the top of the pressure point. When the air pressure in the tube equals the pressure exerted by the column of water above it, then the excess air is released as bubbles through the nozzle. This means the pressure in the air line is proportional to the weight of the water column.



Mid-tide Bubbler

The operation of the mid tide bubbler is similar to that of the full-tide system, except that the measuring point is mounted at the mid tide height. This means that the pressure point is only immersed for half of the tidal cycle. This is so that when the measuring point is exposed as in the photograph it can be levelled accurately into the geodetic network. Once this is accomplished the full tide pressure points can be fitted to match the tidal curve produced by the mid tide pressure point, thereby connecting them to the geodetic network.



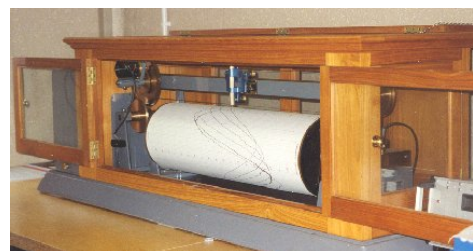
Pressure Transducer

These are differential transducers contained in a watertight housing. The reference port is vented to atmosphere via the power supply and signal cable tube, while the measuring port of the transducer is connected to a copper outlet nozzle on the top of the transducer housing. The nozzle, transducer measuring port and connecting tube are filled with oil. The pressure is transmitted to the crystal element via the oil, keeping the transducer components free from the effects of the saltwater.

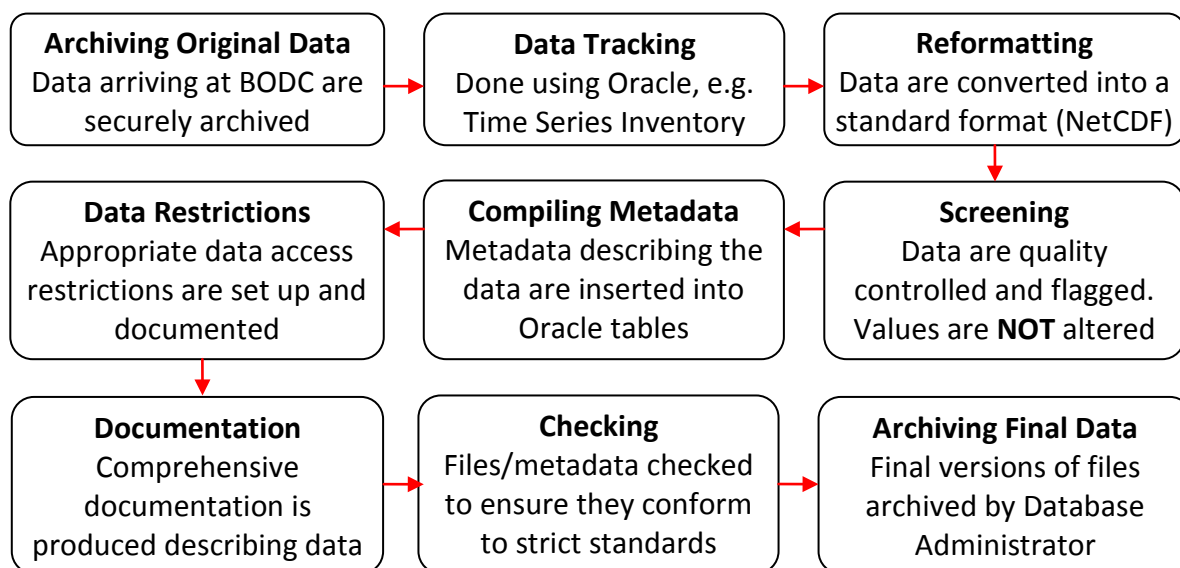


Munro Float Gauge

The Munro gauge measures sea level using a float in a stilling well. The float is about 45cm in diameter - the large diameter reduces inevitable errors in buoyancy due to friction of the gearing and small changes in the length of float wire. This wire is coiled round a drum on the end of the gauge. Another drum contains a counterbalance wire. The drum is geared to a slotted tape attached to a pen carriage, which traces the tide curve on the chart. A precision potentiometer is attached to the gauge to provide an input to the data logger.



Data Processing



Flowchart summarising BODC data processing steps

Data arrive at BODC every week, where they are screened. The data are reviewed and then uploaded to the BODC website each month. They are reviewed annually before being banked (archived) in BODC's National Oceanographic Database. This process is described in more detail below.

Quality Control

All data arriving at BODC are converted to a common standard format. This makes storage and distribution much easier and ensures that parameter codes, flags, units, absent data values, etc, are consistent between different sources. We use a platform-independent binary format called QXF, a sub-set of NetCDF.

Data are quality-controlled weekly, monthly and annually using in-house software. This involves inspecting both recorded values and non-tidal residuals. Examining residuals is especially useful for detecting instrument faults (timing errors, datum shifts, spikes). Harmonic constants may be severely corrupted if the site has highly nonlinear tides, or is influenced by rivers/estuaries or particularly complex basin configuration. To produce more accurate predicted tides, we compute 'fresh' tidal constants from recent data, using Doodson harmonic analysis, rather than just relying upon historical values.

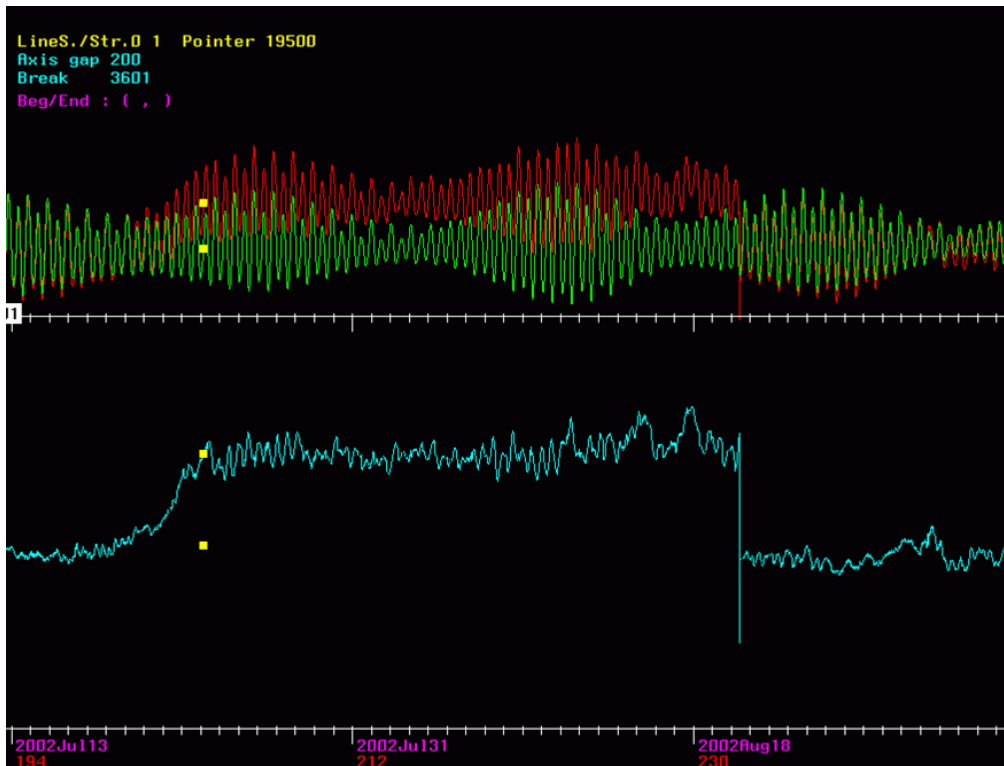
The standard procedure at BODC for the weekly quality control of sea level data includes, where possible:

- Screening the series, looking for spikes, gaps, timing errors and datum shifts
- Screening the series with previous series from the same site
- Screening the series with neighbouring stations covering the same period
- Displaying other parameters, such as sea temperature and atmospheric pressure, to aid quality control

Monthly processing includes checking the statistics produced, e.g., mean sea level, with those produced in previous years.

The annual quality-control process involves producing a tidal analysis and comparing M2, S2, N2, K1, O1 and Z0 constituents with previous data series, adjacent sites and the Admiralty Tide Tables for the closest site.

Data values are considered suspicious if the measured value differs by more than approximately 20mm (for a site of average tidal range) from either the mid-tide channel (if one exists at the site) or the predicted value. The person screening the data will often have to use their own judgement. Suspicious data points are flagged 'M' and any timing errors or datum shifts are noted. An 'N' flag is assigned to those values that are null. No data values are changed. The data quality is noted in accompanying documentation.



Screenshot of BODC visualisation software showing data, analysis and residual
(Legend: Tidal observations (m), Tidal predictions (m) and Residual (m))

Metadata and Documentation

Additional information (metadata) is needed not only for quality control and archiving, but also for exchanging data or integrating them into a regional or global data set. Basic metadata quality control includes checking that, for example, latitude and longitude or start/end dates of records are reasonable.

Sufficient documentation should accompany each data series to ensure that the data can be used with confidence by a secondary user. This documentation should be stored alongside the data, and where applicable, should cover:

Site information

- Brief description of location of tide gauge peculiar characteristics of the tide gauge site (for example, complex local geography, seiching, silting of the harbour, river mouths) (including maps, photos)
- Description of tide gauge benchmarks, their history and method of determination (including maps, photos)
- Datum relationships - Measurements must be relative to a fixed and permanent local tide gauge benchmark (TGBM). This should be connected to auxiliary marks to guard against its movement or destruction. Connections between the TGBM and the gauge zero should be made to an accuracy of a few millimetres regularly (e.g. annually)

Data sampling and processing details

- Sampling scheme e.g. continuous recording, instantaneous, averaged
- Interval between samples and duration of individual samples (raw data)
- Nominal interval of processed data
- Gaps in the data record
- Timing and/or datum corrections applied
- De-spiking/smoothing/interpolating methods and editing procedures

Instrument information

- Instrument description, manufacturer, model, principle of measurement, method of recording - refer to publication or briefly describe
- Instrument modifications and their effect on the data
- Method and times of calibration, calibration factors
- Frequency of cleaning, control of biological fouling
- Operational history
- Pertinent instrument characteristics; for example, for a conventional stilling well, information should include well diameter, orifice depth below mean water level and orifice height above sea bed; for a bubbler gauge - tube length, tube diameter, orifice diameter, density value used to convert to elevation, acceleration due to gravity and the formula used to compensate for tube length.

Auditing and Banking

The metadata and documentation are checked before banking. A Matlab script cross-references the data header files against the metadata to ensure no data-entry errors have been made. Another script checks the data files to make sure timing errors, out-of-range values and nulls have been dealt with.

Datasets that have been completely processed are audited. A second data scientist completes a series of final checks. Any differences of opinion are highlighted and re-examined. Files are then archived and marked as 'banked'. Finally, monthly files are concatenated into yearly files and the yearly file metadata are banked in a database.

Calculating Statistics

Edserplo calculates four types of summary information

- a history of when the tide gauge has been in operation (“history”)
- monthly extremes (“extremes”), relative to Ordnance Datum Newlyn (ODN)
- monthly extreme surges (“surges”)
- monthly and daily mean sea level (“MSL”) relative to ODN

Gaps greater than 4.1 hours in the primary channel are registered as gaps in the history.

Extremes are the maximum and minimum values for each month, calculated from all sampled data excluding any interpolated or flagged values. Surges (extreme residuals) are calculated in the same way from tidal residuals (measured water levels minus the predicted values). The predictions come (at the time of the calculation) from a database of tidal constants for UK ports maintained by NOC’s Marine Data Products Team.

The values in the tables below are the recorded maximum and minimum values deemed good. These may not be the actual maximum and minimum observed. Values are given for both full tide channels. If both channels are fully functioning, they would give similar surge and extreme maxima and minima. If one channel is not working correctly, it may not have measured the largest surge or extreme and the statistics may differ considerably between channels. In this case, the one with greatest data coverage should be used.

Mean Sea Level is calculated from a filter working on quarter-hourly values derived from one or more cubic splines applied to the raw data. The filter is a convolution of Vassie’s O3B filter, which converts 15-minute data to hourly values, and Doodson’s X0 filter. Splines are not applied across gaps as defined above. Short gaps can therefore lead to the loss of a day of output data (the half length of the filter is 91 and a day is 96 samples). Provided there are some daily (@12:00Z) values these are then averaged to provide the monthly value.

PSMSL recommend refraining from computing a mean sea level value where there is a lack of sufficient data available. Consequently, the monthly statistics given in this report don’t feature a mean sea level value for any month where more than 15 days of data are missing (the values given for extremes and surges for these months should be treated with caution). No yearly mean sea level figure is given if more than two monthly mean values are missing and the statistics pages below reflect that. If there are 11 monthly means available, the annual mean is calculated from a weighted average of these (the weight for each month being the number of days for which readings exist).

Data Completeness

Monthly percentage values for data completeness are given for delayed mode data delivery, where data from the primary data channel are quality controlled weekly.

Data Quality

Monthly percentage values for data quality are given for the primary and secondary channels, which have been quality controlled to GLOSS delayed mode data standards (with discrepancies of over 20mm flagged, depending on site). The primary channel is Channel 2 at all sites, apart from Hinkley and Leith where Channel 1 is the primary channel.

UK Tide Gauge Network Map

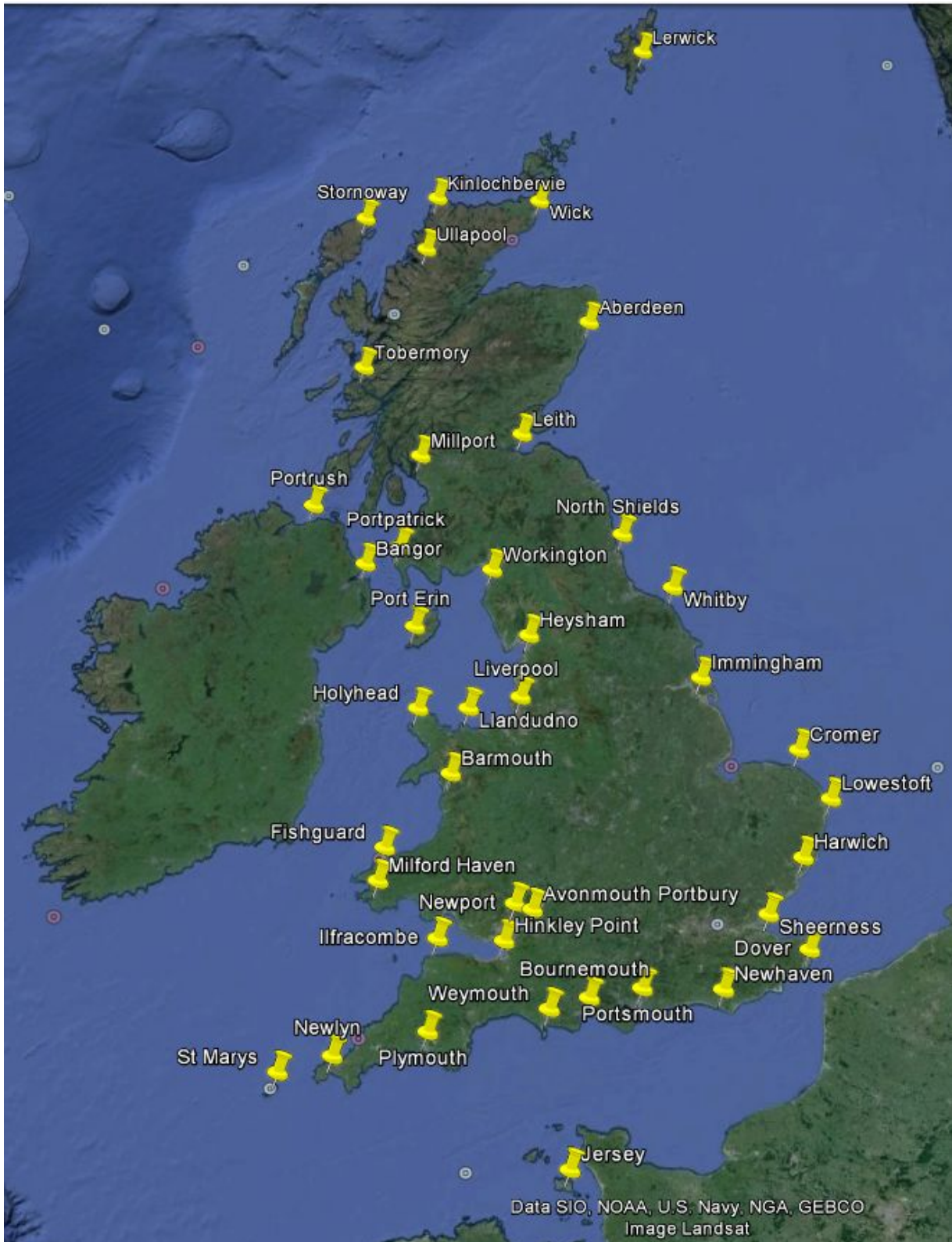


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Data SIO, NOAA, U.S. Navy, NGA, GEBCO / ©2015 Cnes/Spot Image

UK Tide Gauge Data Completeness (%), January to December 2015

Site	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Aberdeen	100	100	100	100	100	100	100	100	100	100	100	100
Avonmouth Portbury	99.97	99.97	100	100	100	100	100	100	100	100	100	100
Bangor	100	100	100	100	100	100	100	100	100	100	100	100
Barmouth	100	100	100	100	100	100	100	100	100	100	100	100
Bournemouth	100	100	100	100	100	100	100	100	100	100	100	100
Cromer	100	100	100	100	100	100	100	100	100	100	100	100
Dover	100	100	100	100	100	100	100	100	100	100	100	100
Fishguard	100	100	100	100	100	100	100	100	100	100	100	100
Harwich	100	100	100	100	100	100	100	100	100	100	100	100
Heysham	100	100	100	100	100	100	100	100	100	100	100	100
Hinkley Point	100	100	100	99.83	99.90	99.97	100	100	100	100	100	100
Holyhead	100	100	100	100	100	100	100	100	100	100	100	100
Ilfracombe	100	100	100	100	100	100	100	100	100	100	100	100
Immingham	100	100	100	100	100	100	100	100	100	100	100	100
Jersey	100	100	99.97	100	100	100	100	100	100	100	100	100
Kinlochbervie	100	100	100	100	100	100	100	100	100	100	100	100
Leith	100	100	100	100	100	100	100	100	100	100	100	100
Lerwick	100	100	99.97	100	100	100	100	100	100	100	100	100
Liverpool	100	100	100	100	100	100	100	100	100	100	100	100
Llandudno	100	100	100	100	100	100	100	100	100	100	100	100
Lowestoft	100	100	100	100	100	100	100	100	100	100	100	100
Milford Haven	100	100	100	100	100	100	100	100	100	100	100	100
Millport	100	100	100	100	100	100	100	100	100	100	100	100
Mumbles	0	0	0	0	0	0	0	0	52.01	100	100	100
Newhaven	100	100	100	100	100	100	100	100	100	100	100	100
Newlyn	100	100	100	100	100	100	100	100	99.83	100	100	100
Newport	100	100	100	100	100	100	100	100	100	100	100	100
North Shields	100	100	100	100	100	100	100	100	100	100	100	100
Plymouth Devonport	100	100	100	100	100	100	100	100	100	100	100	100
Port Erin	100	100	100	100	100	100	100	100	100	100	100	100
Portpatrick	100	100	100	100	100	100	100	100	100	100	100	100
Portrush	100	100	100	100	100	100	100	100	100	100	100	100
Portsmouth	100	100	100	100	100	100	100	100	100	100	100	100
Sheerness	100	100	100	100	100	100	100	100	100	100	100	100
St Marys	100	100	100	100	100	01.22	0	0	0	0	0	0
Stornoway	100	100	100	100	100	100	100	100	100	100	100	100
Tobermory	100	100	100	100	100	100	100	100	100	100	100	100
Ullapool	100	100	100	100	38.94	95.17	100	100	100	100	100	100
Weymouth	100	100	100	100	100	100	100	100	100	100	100	100
Whitby	100	100	100	100	100	100	100	100	100	100	100	100
Wick	100	100	100	100	100	100	100	100	100	100	100	100
Workington	100	100	100	100	100	100	100	100	100	100	100	100

UK Tide Gauge Data Quality (%), January to March 2015

Site	January		February		March	
	Primary	Secondary	Primary	Secondary	Primary	Secondary
Aberdeen	100	0	100	0	100	50.7056
Avonmouth Portbury	99.2605	100	100	100	100	100
Bangor	92.0699	0	99.9256	66.4807	99.9664	54.8723
Barmouth	86.9288	86.9288	78.7202	78.7202	75.2352	75.2352
Bournemouth	0	0	0	0	0	0
Cromer	97.1102	100	88.8765	100	94.1868	100
Dover	0	100	0	100	0	100
Fishguard	100	39.953	99.8884	77.2321	100	72.8831
Harwich	56.586	0	100	0	65.0202	0
Heysham	95.4301	0	100	0	99.9664	0
Hinkley Point	99.496	0	99.9628	0	99.7312	0
Holyhead	100	100	40.9226	100	19.3212	100
Ilfracombe	100	100	92.1875	99.9628	99.9328	99.9328
Immingham	0	100	0	100	0	100
Jersey	100	100	100	100	100	100
Kinlochbervie	0	100	0	100	86.2567	100
Leith	100	100	100	100	100	100
Lerwick	100	100	100	100	99.7647	99.7647
Liverpool	75.1344	48.9919	96.2426	20.7589	99.4624	18.4812
Llandudno	95.8333	95.8333	97.9911	97.9911	86.996	86.996
Lowestoft	100	100	99.9628	100	99.8992	99.9664
Milford Haven	91.2634	99.0255	87.128	90.7738	100	100
Millport	100	100	100	100	100	100
Mumbles	0	0	0	0	0	0
Newhaven	100	100	100	99.7768	99.9664	99.7984
Newlyn	100	0	17.2619	0	80.5444	0
Newport	0	100	0	97.2098	0	98.8239
North Shields	100	100	100	100	100	100
Plymouth Devonport	100	100	100	99.9628	100	100
Port Erin	100	100	100	100	99.8992	99.8992
Portpatrick	0	100	0	99.9256	0	99.9664
Portrush	85.1478	100	83.7798	62.686	100	83.3333
Portsmouth	100	100	99.9628	99.9628	100	100
Sheerness	0	100	0	100	0	100
St Marys	83.4341	99.9664	25.372	100	0	99.9664
Stornoway	9.6774	99.9664	37.128	100	4.8723	100
Tobermory	100	12.9032	100	99.9628	100	100
Ullapool	100	100	99.9628	100	100	100
Weymouth	100	100	99.9256	99.9628	100	100
Whitby	99.496	99.496	99.0699	99.0699	98.4543	98.6895
Wick	1.4449	96.1694	100	55.6548	100	99.8656
Workington	99.3616	99.3616	99.8884	99.8884	99.5632	99.5632

UK Tide Gauge Data Quality (%), April to June 2015

Site	April		May		June	
	Primary	Secondary	Primary	Secondary	Primary	Secondary
Aberdeen	77.5347	100	11.2231	99.9664	0	100
Avonmouth Portbury	100	100	99.664	100	99.3403	99.8264
Bangor	100	23.7153	98.9247	51.0081	100	16.1111
Barmouth	72.4306	72.4306	77.453	77.453	78.4028	78.4028
Bournemouth	0	0	0	0	0	0
Cromer	36.3194	100	62.5336	100	100	100
Dover	0	100	0	100	0	100
Fishguard	100	72.4653	99.9664	91.9019	12.0139	100
Harwich	60	60	99.9328	100	98.3333	100
Heysham	100	0	100	0	100	0
Hinkley Point	99.0609	0	96.1319	0	96.0056	0
Holyhead	30.3125	100	51.6801	100	86.1111	96.3194
Ilfracombe	100	99.4444	100	100	51.875	100
Immingham	0	100	35.5511	100	57.9167	100
Jersey	100	100	100	100	100	100
Kinlochbervie	100	100	100	100	100	100
Leith	100	100	99.9328	99.9328	100	99.2708
Lerwick	100	100	100	100	100	100
Liverpool	100	59.2708	98.9583	76.5121	99.9653	0.17361
Llandudno	100	100	100	100	99.9653	100
Lowestoft	99.9653	99.9306	99.9664	99.1263	99.9653	82.0139
Milford Haven	100	100	99.664	99.664	99.2361	100
Millport	100	100	100	100	100	100
Mumbles	0	0	0	0	0	0
Newhaven	99.9653	100	100	100	100	100
Newlyn	100	0	100	0	79.2014	0
Newport	0	99.6181	0	99.9664	0	99.9653
North Shields	84.9653	99.7569	94.5901	100	100	100
Plymouth Devonport	100	100	100	100	100	100
Port Erin	100	100	100	100	100	100
Portpatrick	0	100	0	100	0	100
Portrush	100	100	100	92.9772	100	21.1806
Portsmouth	100	100	100	100	100	100
Sheerness	0	100	0	41.3642	73.7847	100
St Marys	6.875	87.2222	9.9798	34.375	0	0
Stornoway	0	100	0	100	0	100
Tobermory	100	100	100	100	100	100
Ullapool	99.8611	99.8958	100	100	99.9635	65.7424
Weymouth	100	100	100	100	100	100
Whitby	69.8611	19.7917	0	0	0	0
Wick	100	99.8958	100	78.461	73.0903	64.0625
Workington	100	99.8264	100	100	99.9653	99.8611

UK Tide Gauge Data Quality (%), July to September 2015

Site	July		August		September	
	Primary	Secondary	Primary	Secondary	Primary	Secondary
Aberdeen	0	100	0	100	0	100
Avonmouth Portbury	98.8239	100	99.328	100	58.2986	100
Bangor	96.4046	0	86.2567	0	100	0
Barmouth	89.7177	89.7177	73.5551	73.5551	64.7222	64.7222
Bournemouth	0	0	0	0	0	0
Cromer	97.379	100	98.4207	100	89.4097	100
Dover	0	100	0	100	0	99.9306
Fishguard	0	100	56.1156	99.8656	100	100
Harwich	100	100	100	100	100	100
Heysham	92.6747	0	0	0	31.3194	50
Hinkley Point	96.1358	0	99.3952	0	99.375	0
Holyhead	96.2702	100	100	100	94.4792	100
Ilfracombe	0	98.1519	0	100	65.9722	96.7361
Immingham	10.4167	92.1371	0	99.9664	0	97.0833
Jersey	100	100	100	100	98.0556	100
Kinlochbervie	100	100	100	100	100	100
Leith	100	100	100	100	100	100
Lerwick	100	100	100	100	100	100
Liverpool	100	1.1425	99.9664	0	100	0
Llandudno	100	100	98.6223	98.6223	99.9653	99.9653
Lowestoft	100	100	99.9328	99.9328	99.5486	100
Milford Haven	100	68.3468	100	0	55.5903	0
Millport	100	100	100	100	100	100
Mumbles	0	0	0	0	0	0
Newhaven	100	100	100	100	99.9653	99.9306
Newlyn	67.7755	0	75.8065	0	56.0696	63.3043
Newport	0	100	0	97.1102	0	96.8056
North Shields	100	100	100	100	100	100
Plymouth Devonport	100	100	100	100	99.9306	99.9306
Port Erin	99.9664	99.9664	100	100	100	100
Portpatrick	0	100	0	100	0	100
Portrush	100	70.5309	100	26.0081	100	27.6389
Portsmouth	100	100	100	100	100	100
Sheerness	35.5847	100	15.3898	49.5968	0	99.8611
St Marys						
Stornoway	1.1761	100	0	100	52.2222	99.9653
Tobermory	100	100	100	100	100	100
Ullapool	100	100	100	100	100	86.9792
Weymouth	100	100	45.9005	100	81.5278	100
Whitby	0	0	0	0	27.1528	0
Wick	10.4167	99.9328	8.3333	100	99.9306	87.9167
Workington	99.8992	99.8656	99.832	99.7648	100	99.9653

UK Tide Gauge Data Quality (%), October to December 2015

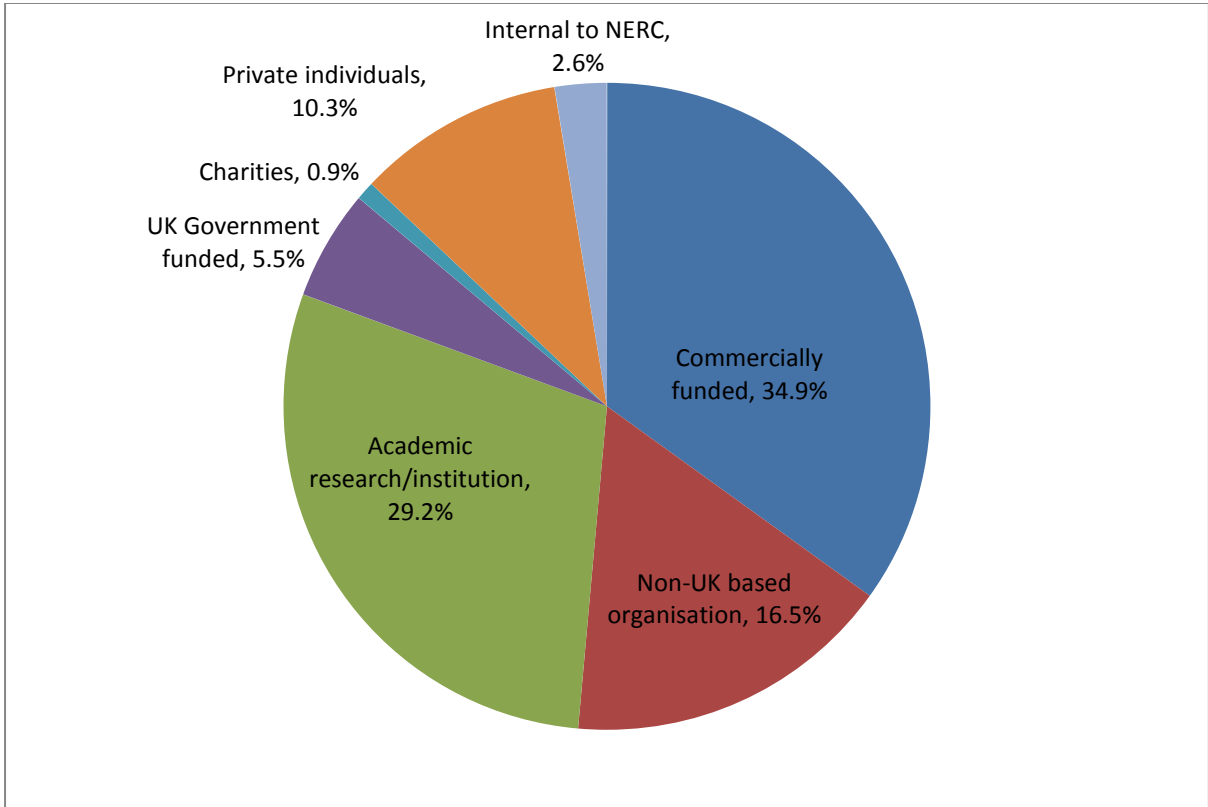
Site	October		November		December	
	Primary	Secondary	Primary	Secondary	Primary	Secondary
Aberdeen	0	100	0	26.4583	8.9718	1.5457
Avonmouth Portbury	83.6694	100	96.4236	100	98.6895	99.0591
Bangor	95.1613	0	93.7847	0	94.3548	41.8011
Barmouth	68.7836	68.7836	66.3194	66.3194	38.3065	38.3065
Bournemouth	0	0	0	0	0	0
Cromer	98.5887	100	94.3403	100	79.9059	100
Dover	0	100	67.0833	98.7153	88.6761	88.6425
Fishguard	100	100	100	100	100	100
Harwich	100	100	100	100	100	100
Heysham	0	5.0403	8.4722	0	0	0
Hinkley Point	97.8831	0	99.7569	0	99.1263	0.10081
Holyhead	48.0511	97.7151	72.3264	71.1111	41.4987	41.4987
Ilfracombe	88.5417	93.246	81.3889	46.8056	93.2796	0
Immingham	0	17.7083	0	0	0	0
Jersey	100	100	93.2986	100	100	100
Kinlochbervie	100	100	100	100	100	100
Leith	100	100	100	100	100	100
Lerwick	100	100	100	100	92.2379	99.8992
Liverpool	77.3858	0	100	7.9167	100	7.3925
Llandudno	100	100	96.8056	96.8056	100	100
Lowestoft	95.1613	100	83.9236	100	100	100
Milford Haven	100	0	99.5486	0	71.9086	0
Millport	100	100	100	100	100	100
Mumbles	0	0	0	0	0	0
Newhaven	100	100	99.9653	99.9653	100	99.1263
Newlyn	100	40.8266	100	20	100	0
Newport	0	97.1774	0	91.3194	71.9086	60.5511
North Shields	35.9207	100	100	100	100	100
Plymouth Devonport	100	100	100	100	78.8978	78.8978
Port Erin	100	100	100	100	100	100
Portpatrick	0	100	0	100	0	100
Portrush	100	40.5578	100	48.8194	99.9328	25.1008
Portsmouth	100	100	99.9653	99.9653	100	100
Sheerness	0	36.5927	0	54.7917	0	100
St Marys						
Stornoway	2.5538	100	0	100	0	100
Tobermory	100	59.4758	99.9653	12.1528	100	0
Ullapool	100	97.7823	100	100	99.8656	99.8656
Weymouth	43.078	99.8992	0	100	0	100
Whitby	5.3091	0	0	20	0	25.8065
Wick	78.4946	99.8992	99.9653	43.125	100	0
Workington	100	100	100	100	100	100

Requests to BODC for UKCMF Data in 2015, Data Downloads

Site	Heights		Surges		Extremes		Means		TOTAL Downloads
	Down loads	Site Years	Down loads	Site Years	Down loads	Site Years	Down loads	Site Years	
Aberdeen	134	843.48	26	306.5	24	132.17	25	191.17	209
Avonmouth	32	392	15	183	21	264	16	200	84
Avonmouth Portbury	102	132.92	14	51.58	17	63.67	13	57.67	146
Bangor	63	172.67	12	100.67	11	63.17	10	58.17	96
Barmouth	70	266.25	12	65.08	12	65.08	12	65.08	106
Bournemouth	126	604.32	12	105	9	73	12	127	159
Cromer	93	538.08	31	260.33	31	233.25	29	283.08	184
Dover	142	1256.48	19	163.83	16	136.5	13	162.08	190
Fishguard	60	238.92	10	51.5	12	102.92	9	50.5	91
Harwich	169	445.05	19	90.92	16	87	18	105.08	222
Heysham	190	541.89	26	131.83	65	1074.59	24	129.83	305
Hinkley Point	177	324.8	25	172.08	27	197	22	99	251
Holyhead	176	259.97	8	28.67	15	127.33	14	40.83	213
IOM Port Erin	157	223.39	8	48.17	8	48.17	9	59.17	182
Islay	9	84	2	22	2	22	2	22	15
Ilfracombe	177	588.14	17	125.08	18	102.42	19	103.42	231
Immingham	195	954.39	30	125.75	40	239.08	34	281.42	299
Jersey	138	216.39	5	70.83	4	70.75	4	50.33	151
Kinlochbervie	145	129.14	7	27	7	27	5	26.83	164
Leith	42	271.25	18	148.67	19	144.83	19	95	98
Lerwick	50	512.17	13	71.58	11	71.67	11	46.08	85
Liverpool	146	502.24	59	305.41	104	446.07	97	346.16	406
Llandudno	53	193.5	17	61.08	19	44.08	18	62.08	107
Lowestoft	78	854	30	238.75	31	313.25	26	235.67	165
Milford Haven	49	468.67	16	150.67	20	179.33	17	143.33	102
Millport	30	305.25	6	54.83	6	31.5	7	33.83	49
Mumbles	119	534.82	26	211	28	229	27	233	200
Newhaven	62	485.17	21	113.5	22	96.58	21	111.42	126
Newlyn	106	1502.33	30	224.42	42	143.08	39	163.58	217
Newport	109	479.65	19	169.92	22	215	20	129.92	170
North Shields	48	601.75	21	179.58	21	245.75	15	116.5	105
Plymouth Devonport	168	572.41	39	213.41	43	281.5	40	217.58	290
Portpatrick	104	362.25	7	71.92	5	48.83	4	47.83	120
Portrush	105	280.5	11	35.25	11	35.25	10	35.17	137
Portsmouth	180	708.41	38	188.83	37	242.91	31	141.33	286
Sheerness	139	1195.17	28	321.08	25	247.17	24	243.25	216
St Marys	98	186.35	10	78.83	7	52.75	8	53.75	123
Stornoway	102	144.59	11	37.17	12	38.17	6	34.83	131
Tobermory	92	163.92	8	53.75	8	53.75	6	53.58	114
Ullapool	88	200.25	7	40.08	7	40.08	5	39.92	107
Weymouth	140	639.5	28	280.58	26	243.67	25	207.33	219
Whitby	115	405.17	22	156.83	20	117.17	20	93.17	177
Wick	99	252.75	13	63.75	12	87.67	9	53.08	133
Workington	119	311.84	16	88.5	20	142.17	15	65.67	170
TOTALS	4796	20346.1	812	5689.21	933	6920.33	810	5115.72	7351

'Download' is defined here as a request for a data set of a specific type for a single site. One data request may be for multiple data sets of different types from more than one site.

Requests to BODC for UKCMF Data in 2015 by User Category



Aberdeen – Tide Gauge Information

Latitude 57° 08' 38.5" N **Longitude** 02° 04' 38.5" W **Grid Ref** NJ 9525 0591

Instrument Data acquisition system with two full tide and a mid-tide bubbler gauge

Location **Tide Gauge Building** Waterloo Quay

Measuring Points The South West corner of Telford Dock

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	NJ 9525 0590	New bolt N side jetty Waterloo Quay
Aux1	NJ 9572 0593	Building NW side York Place SE face E angle
Aux2	NJ 9586 0571	Observatory Pocra Quay N face NW angle
Aux3	NJ 9524 0600	Building NE side Waterloo Quay SW face S angle

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 2.25m below Ordnance Datum Newlyn (ODN)

TGZ = 6.318m below TGBM

Levelling No levelling was carried out in 2015

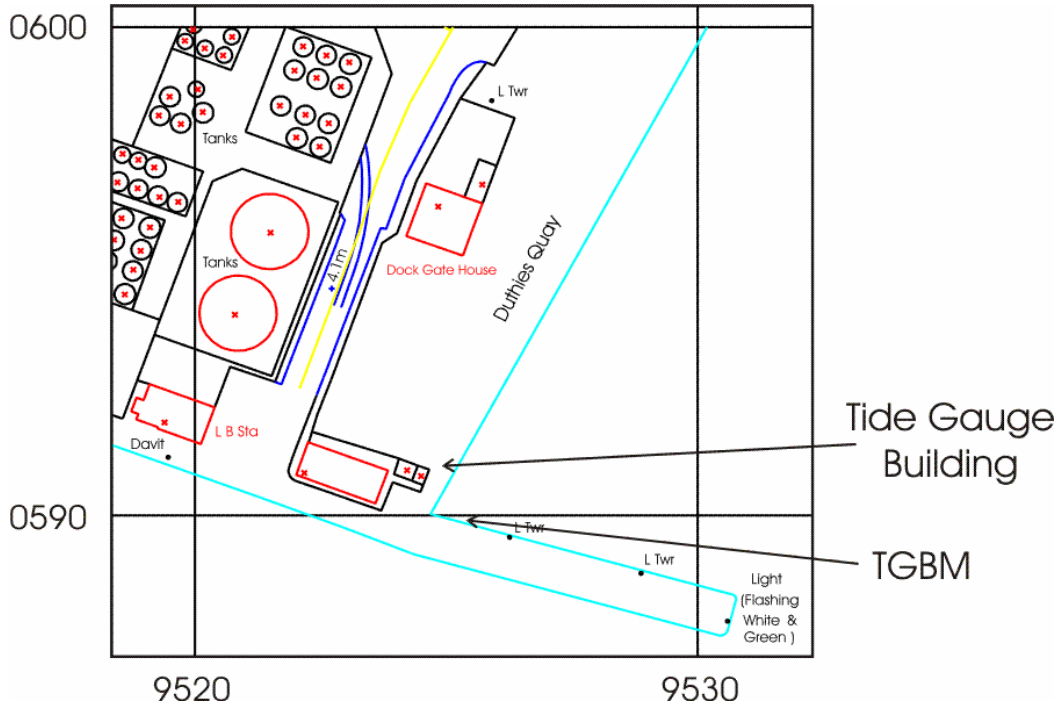
Site visits

20/05/2015 (Day 140) Maintenance.

Notes on Data Quality

Channel 2 has been flagged from May to December and Channel 1 flagged January to March and November to December. This is due to the pressure points becoming blocked.

Aberdeen – Map & Images of Site



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Tide gauge location



Aerial view of site

Aberdeen – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan				0.842	10	16:30:00				-0.276	22	04:45:00
Feb				0.412	23	08:45:00				-0.443	8	05:00:00
Mar	0.474	29	01:15:00	0.808	10	07:45:00	-0.374	22	01:00:00	-0.537	9	19:30:00
Apr	0.296	14	10:15:00	0.327	14	10:15:00	-0.338	8	10:45:00	-0.31	8	10:45:00
May	0.398	12	03:30:00	0.441	12	03:30:00	-0.259	23	05:45:00	-0.089	10	17:45:00
Jun	0.344	3	00:15:00				-0.319	8	23:45:00			
July	0.26	21	12:15:00				-0.203	2	08:45:00			
Aug	0.254	5	01:45:00				-0.151	31	12:30:00			
Sep	0.205	17	11:45:00				-0.299	28	13:45:00			
Oct	0.668	22	15:45:00				-0.261	13	02:30:00			
Nov	0.297	7	03:30:00				-0.269	8	18:45:00			
Dec	0.365	2	11:15:00	0.716	5	11:15:00	-0.062	2	00:30:00	-0.191	7	06:45:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan				2.612	10	16:30:00				-2.144	22	20:45:00
Feb				2.597	19	13:30:00				-2.049	20	20:30:00
Mar	2.566	23	15:15:00	2.586	23	15:15:00	-2.485	21	20:15:00	-2.462	21	20:15:00
Apr	2.154	19	13:30:00	2.187	19	13:30:00	-2.245	18	19:00:00	-2.216	18	19:00:00
May	2.287	18	13:15:00	1.944	6	14:45:00	-1.809	20	08:30:00	-1.45	3	19:00:00
Jun	2.113	3	01:15:00				-1.688	19	08:45:00			
July	2.164	5	03:00:00				-1.873	4	08:30:00			
Aug	2.467	31	01:45:00				-2.155	31	08:00:00			
Sep	2.471	1	02:30:00				-2.284	29	07:30:00			
Oct	2.589	30	02:30:00				-1.973	1	09:00:00			
Nov	2.027	1	04:15:00				-1.067	1	23:00:00			
Dec	1.579	2	05:45:00	1.85	5	09:45:00	-0.939	2	00:00:00	-0.786	7	04:45:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	0	*	31	0.429
February	0	*	28	0.237
March	15	*	31	0.229
April	30	0.17	22	0.167
May	31	0.255	0	*
June	30	0.206	0	*
July	31	0.277	0	*
August	31	0.315	0	*
September	30	0.278	0	*
October	31	0.339	0	*
November	7	*	0	*
December	0	*	0	*
TOTAL & AVG	236	**	112	**

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Avonmouth Portbury – Tide Gauge Information

Latitude 51° 30' 00.0" N **Longitude** 02° 43' 42.5" W **Grid Ref** ST 4953 7815

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge

Location **Tide Gauge Building** Western, seaward side of the jetty

Measuring Points On the wall below the tide gauge cabinet

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	ST 4953 7815	Brass bolt quay edge adjacent to tide gauge
AUX 1	ST 4986 7774	Brass pin coping stone SW corner Portbury Dock

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 6.50m below Ordnance Datum Newlyn (ODN)

TGZ = 9.226m below TGBM

Levelling No levelling was carried out in 2015

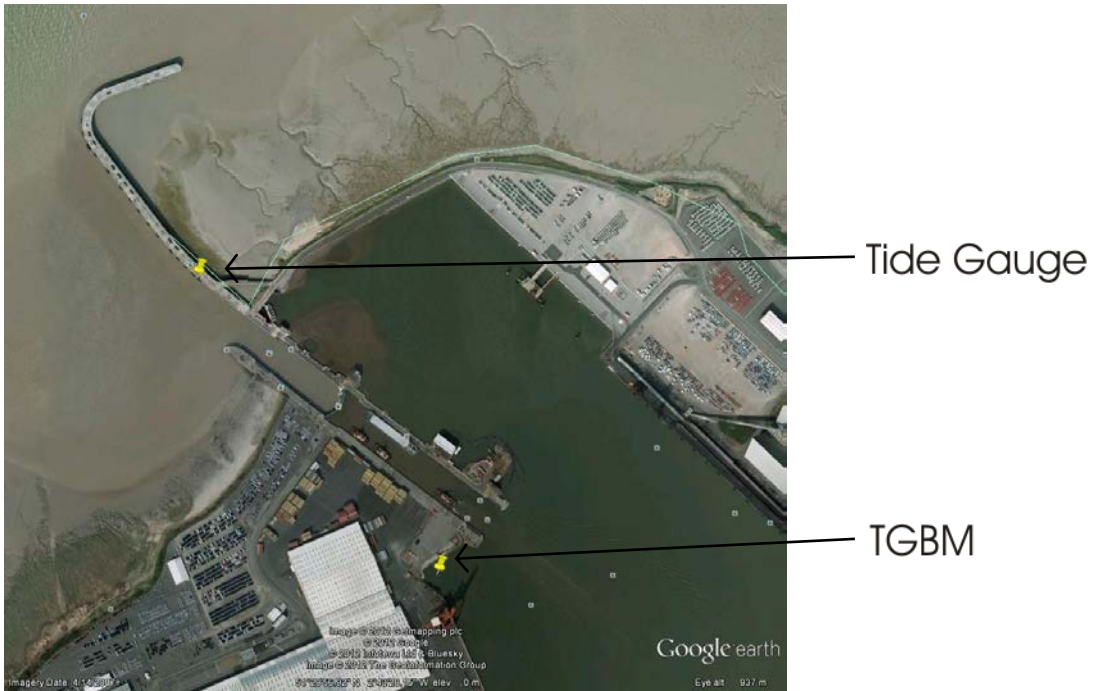
Site visits

No site visits were carried out in 2015

Notes on Data Quality

Channel 2 began blocking in September and the data were flagged accordingly.

Avonmouth Portbury – Map & Images of Site



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Image © 2013 The Geoinformation Group



Avonmouth Portbury – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	1.504	15	02:15:00	1.507	15	02:15:00	-1.085	30	10:45:00	-1.072	30	10:45:00
Feb	1.078	23	16:30:00	1.091	23	16:30:00	-0.866	6	06:15:00	-0.857	6	06:15:00
Mar	1.061	31	02:00:00	1.071	31	02:00:00	-0.752	21	17:30:00	-0.74	21	17:30:00
Apr	0.711	1	23:00:00	0.72	1	23:00:00	-0.668	21	16:15:00	-0.652	21	16:15:00
May	1.147	5	17:45:00	1.156	5	17:45:00	-0.603	23	17:15:00	-0.59	23	17:15:00
Jun	0.958	2	02:15:00	0.974	2	02:15:00	-0.759	10	10:30:00	-0.749	10	10:15:00
July	0.912	26	22:30:00	0.924	26	22:30:00	-0.444	15	23:45:00	-0.437	15	23:45:00
Aug	0.833	4	04:00:00	0.844	4	04:00:00	-0.689	31	17:45:00	-0.676	31	17:45:00
Sep	0.995	14	15:15:00	1.011	14	15:15:00	-1.126	29	05:00:00	-1.115	29	05:00:00
Oct	0.692	7	04:00:00	0.712	7	04:00:00	-0.744	1	04:30:00	-0.728	1	04:30:00
Nov	1.326	14	16:00:00	1.343	14	16:00:00	-0.996	21	11:30:00	-0.987	21	11:30:00
Dec	1.046	12	15:15:00	1.063	12	15:15:00	-0.61	30	17:30:00	-0.598	30	17:30:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	7.751	23	09:15:00	7.754	23	09:15:00	-6.056	22	15:45:00	-6.043	22	15:45:00
Feb	8.243	21	09:00:00	8.244	21	09:00:00	-6.2	20	15:30:00	-6.187	20	15:30:00
Mar	8.062	22	08:45:00	8.059	22	08:45:00	-6.458	21	15:15:00	-6.443	21	15:15:00
Apr	7.69	20	08:15:00	7.689	20	08:15:00	-6.199	19	14:45:00	-6.185	19	14:45:00
May	7.512	18	19:30:00	7.512	18	19:30:00	-5.565	20	03:15:00	-5.552	20	03:15:00
Jun	6.697	4	20:30:00	6.698	4	20:30:00	-5.358	4	02:45:00	-5.346	4	02:45:00
July	7.157	4	21:00:00	7.16	4	21:00:00	-5.496	5	04:00:00	-5.483	5	04:00:00
Aug	8.152	31	20:30:00	8.158	31	20:30:00	-6.047	31	03:00:00	-6.032	31	03:00:00
Sep	8.065	29	20:15:00	8.071	29	20:15:00	-6.445	30	03:30:00	-6.425	30	03:30:00
Oct	8.189	28	19:45:00	8.206	28	19:45:00	-6.123	1	04:15:00	-6.105	1	04:15:00
Nov	7.543	27	07:45:00	7.568	27	07:45:00	-5.792	26	14:15:00	-5.778	26	14:15:00
Dec	7.333	26	07:30:00	7.351	26	07:30:00	-5.255	28	03:30:00	-5.243	28	03:30:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.633	30	0.634
February	28	0.491	28	0.498
March	31	0.483	31	0.49
April	30	0.481	30	0.488
May	31	0.605	31	0.612
June	30	0.524	30	0.531
July	31	0.643	31	0.651
August	31	0.659	29	0.673
September	30	0.622	14	*
October	31	0.653	21	0.688
November	30	0.771	23	0.838
December	29	0.802	26	0.817
TOTAL & AVG	363	0.614	324	0.632

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Bangor – Tide Gauge Information

Latitude 54° 39' 53.1" N **Longitude** 05° 40' 10.1" W **Grid Ref** NW 6340 3620

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge

Location **Tide Gauge Building** Central Pier at Bangor Marina

Measuring Points The seaward side of the open pier, directly beneath the tide gauge building

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Belfast (ODB).

Benchmark	Grid Ref	Description
TGBM	5043 8212 (Sheet 115)	S S Pin Tide gauge building Central Pier
Aux1	5038 8200 (Sheet 115)	Cut mark Clock tower

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 2.01m below Ordnance Datum Belfast (ODB)

TGZ = 5.592m below TGBM

Levelling No levelling was carried out in 2015

Site visits

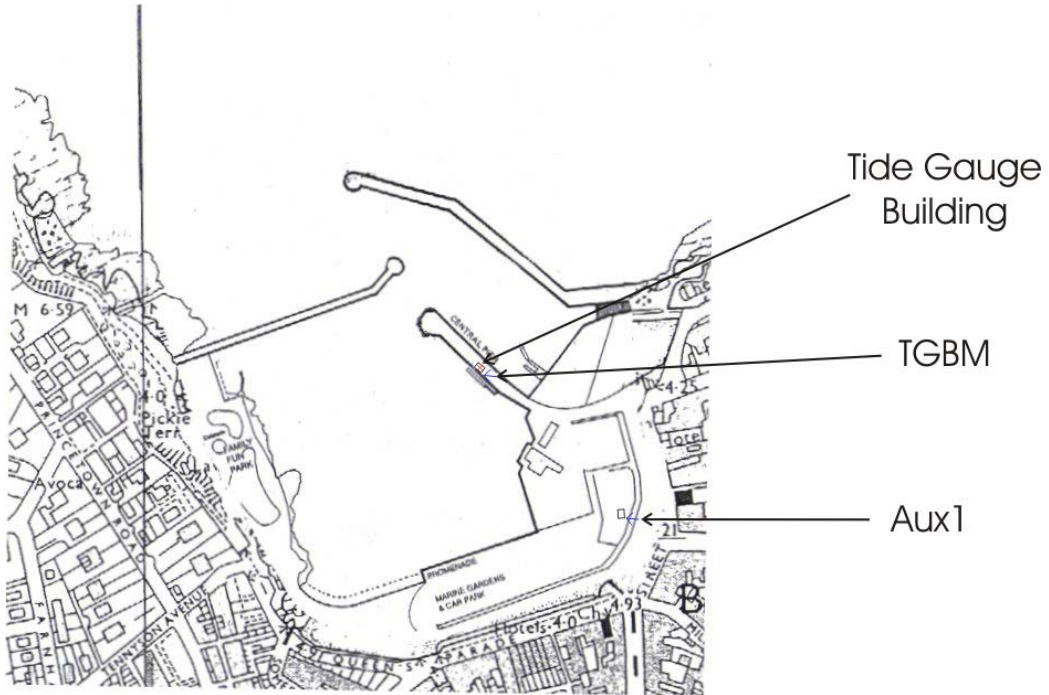
04/02/2015 (Day 035) Clear blocking channels.

15/12/2015 (Day 349) Maintenance. Diving - refurbishment of the lower section of steelwork. Clear blocking channel.

Notes on Data Quality

Channel 1 has been blocking throughout the year and flagged accordingly. This is due to the poor condition of the fittings on the underwater equipment at the site, which cause the system to block. The site was visited in February to try to repair the fittings and dived on in December to refurbish the steelwork.

Bangor – Map & Images of Site



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Bangor – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan				1.151	15	05:15:00				-0.443	31	20:00:00
Feb	0.759	28	23:15:00	0.771	28	23:15:00	-0.507	7	00:45:00	-0.502	7	00:45:00
Mar	0.739	31	01:30:00	0.752	31	01:30:00	-0.417	10	12:45:00	-0.417	10	12:45:00
Apr	0.304	12	13:00:00	0.306	12	13:00:00	-0.253	21	23:15:00	-0.32	3	22:15:00
May	0.409	5	18:00:00	0.418	5	18:00:00	-0.251	26	22:45:00	-0.262	23	02:00:00
Jun	0.777	1	19:45:00	0.773	1	19:45:00	-0.137	18	22:15:00	-0.442	8	15:30:00
July				0.371	6	23:30:00				-0.209	8	17:45:00
Aug				0.367	26	06:45:00				-0.129	31	11:15:00
Sep				0.255	16	11:30:00				-0.306	30	11:45:00
Oct				0.482	29	07:45:00				-0.309	12	22:45:00
Nov				0.772	12	19:30:00				-0.584	21	09:15:00
Dec	1.005	30	08:00:00	1.012	30	07:30:00	-0.057	27	11:00:00	-0.35	6	18:45:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan				1.995	15	05:30:00				-1.835	24	19:45:00
Feb	2.086	22	13:45:00	2.095	22	13:45:00	-1.856	21	19:00:00	-1.848	21	19:00:00
Mar	1.679	9	13:15:00	1.692	9	13:00:00	-1.985	20	17:00:00	-2.075	21	17:45:00
Apr	1.431	19	11:15:00	1.463	25	03:30:00	-1.851	18	17:15:00	-1.949	18	16:30:00
May	1.724	5	12:00:00	1.721	5	12:00:00	-1.766	20	06:00:00	-1.756	20	06:15:00
Jun	1.906	1	22:15:00	1.904	1	22:15:00	-1.547	4	06:00:00	-1.777	8	09:00:00
July				1.858	7	02:30:00				-1.621	5	07:00:00
Aug				1.909	3	00:30:00				-1.802	31	05:30:00
Sep				1.689	2	01:00:00				-1.871	29	05:15:00
Oct				1.984	28	23:45:00				-1.754	1	06:45:00
Nov				1.854	16	01:15:00				-1.637	23	02:15:00
Dec	2.258	30	14:30:00	2.308	30	13:45:00	-1.438	27	18:15:00	-1.432	27	18:15:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	0	*	25	0.054
February	6	*	28	-0.069
March	9	*	31	-0.055
April	0	*	30	-0.082
May	1	*	29	0.027
June	0	*	30	-0.033
July	0	*	28	0.05
August	0	*	25	0.093
September	0	*	30	0.027
October	0	*	24	0.102
November	0	*	23	0.215
December	5	*	25	0.341
TOTAL & AVG	21	**	328	0.056

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Barmouth – Tide Gauge Information

Latitude 52° 43' 09.6" N **Longitude** 04° 02' 42.1" W **Grid Ref** SH 6197 1548

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge
Location **Tide Gauge Building** Toll booth on the north end of Barmouth railway bridge
Measuring Points Attached to the first leg of the railway bridge in the deep channel

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
 The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	SH 6197 1548	NBM rivet concrete 2.9M NE wall junction
Aux 1	SH 6173 1558	Rivet step NE side of road NW entrance path
Aux 2	SH 6186 1556	Rivet wall SE side road 17.6M E steps
Aux 3	SH 6196 1550	Rivet step E side lifeboat station

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)
 TGZ = 2.44m below ODN
 TGZ = 10.363m below TGBM

Levelling No levelling was carried out in 2015

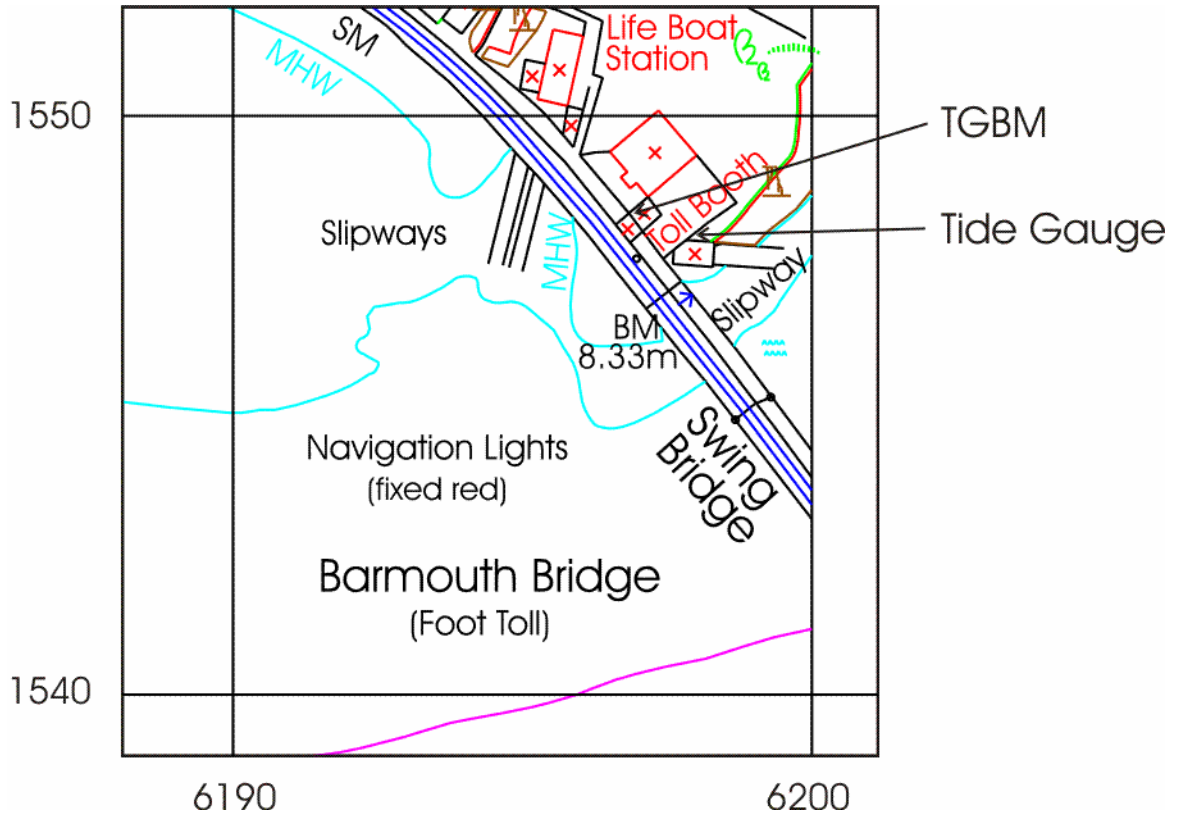
Site visits

05/05/2015 (Day 125) Maintenance. Compressor change.

Notes on Data Quality

The pressure points were torn off in a storm in January 2013. At the time, a temporary repair was made, terminating and securing the pressure lines. Due to the lack of pressure points, the full tide channels are lagging on most falling tides and have been flagged over high waters. The effect is more pronounced on falling spring tides. This was particularly noticeable in March due to the extreme spring range in 2015. Both of the full tides are lower than the mid-tide channel. The full tide channels have been flagged accordingly.

Barmouth – Map & Images of Site



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Barmouth – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	1.508	15	00:00:00	1.51	15	00:00:00	-0.465	31	16:00:00	-0.459	31	16:00:00
Feb	0.744	23	23:45:00	0.746	23	23:45:00	-0.524	9	01:45:00	-0.532	9	01:45:00
Mar	0.95	30	23:30:00	0.954	30	23:30:00	-0.515	13	18:45:00	-0.509	13	18:45:00
Apr	0.587	12	12:15:00	0.593	12	12:15:00	-0.357	12	21:30:00	-0.351	12	21:30:00
May	0.961	5	17:30:00	0.965	5	17:30:00	-0.256	23	03:30:00	-0.261	23	03:30:00
Jun	0.787	1	20:30:00	0.787	1	20:30:00	-0.467	8	15:45:00	-0.462	8	15:45:00
July	0.411	26	23:45:00	0.43	26	23:45:00	-0.227	16	02:00:00	-0.217	16	02:00:00
Aug	0.52	26	07:30:00	0.519	26	07:30:00	-0.19	13	01:30:00	-0.192	13	01:30:00
Sep	0.251	16	08:15:00	0.252	16	08:15:00	-0.364	30	05:45:00	-0.369	30	05:45:00
Oct	0.541	5	08:45:00	0.544	5	08:45:00	-0.356	13	03:45:00	-0.357	13	03:45:00
Nov	1.368	17	19:30:00	1.365	17	19:30:00	-0.873	21	07:15:00	-0.873	21	07:15:00
Dec	1.042	30	06:45:00	1.043	30	06:45:00	-0.226	12	01:45:00	-0.229	12	01:45:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	3.137	23	10:00:00	3.142	23	10:00:00	-1.687	21	16:15:00	-1.701	21	16:15:00
Feb	3.308	20	09:00:00	3.311	20	09:00:00	-1.687	8	05:15:00	-1.702	8	05:45:00
Mar	3.194	22	09:30:00	3.2	22	09:30:00	-1.686	6	03:45:00	-1.698	5	15:45:00
Apr	2.966	20	09:15:00	2.972	20	09:15:00	-1.687	3	15:00:00	-1.7	3	15:00:00
May	3.003	18	20:30:00	3.008	18	20:30:00	-1.686	15	12:45:00	-1.692	15	12:45:00
Jun	2.922	1	19:30:00	2.926	1	19:30:00	-1.683	16	15:15:00	-1.683	19	05:15:00
July	2.835	6	23:30:00	2.843	6	23:30:00	-1.684	16	03:30:00	-1.681	16	03:30:00
Aug	3.262	2	21:45:00	3.266	31	21:30:00	-1.685	2	17:00:00	-1.694	2	17:00:00
Sep	3.164	1	22:15:00	3.167	1	22:15:00	-1.687	2	05:45:00	-1.701	2	05:45:00
Oct	3.447	28	20:45:00	3.449	28	20:45:00	-1.687	2	05:45:00	-1.701	2	06:00:00
Nov	3.106	29	10:30:00	3.105	29	10:30:00	-1.686	26	16:00:00	-1.692	26	16:00:00
Dec	3.1	30	11:15:00	3.098	30	11:15:00	-1.442	12	03:30:00	-1.441	12	03:30:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	16	0.399	16	0.402
February	9	*	9	*
March	14	*	14	*
April	10	*	10	*
May	13	*	13	*
June	11	*	11	*
July	21	0.286	21	0.298
August	9	*	9	*
September	4	*	4	*
October	7	*	7	*
November	4	*	4	*
December	0	*	0	*
TOTAL & AVG	118	**	118	**

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Bournemouth – Tide Gauge Information

Latitude 50° 42' 51.6" N **Longitude** 01° 52' 29.5" W **Grid Ref** SZ 0893 9053

Instrument Temporary 'Vega' radar gauge installation

Location **Tide Gauge Building** Electrical room at the west side of the South Pier

Measuring Points Directly below the electrical room, on a pier leg

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
Aux1	SZ 0869 9066	Cut mark Wall
Aux2	SZ 0893 9083	Cut mark Pillar
REF A	SZ 0893 9052	Steelwork clamp
REF B	SZ 0893 9052	Mid-tide pressure point nozzle

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 1.40m below ODN

TGZ = 5.96m below Aux1

Levelling No levelling was carried out in 2015

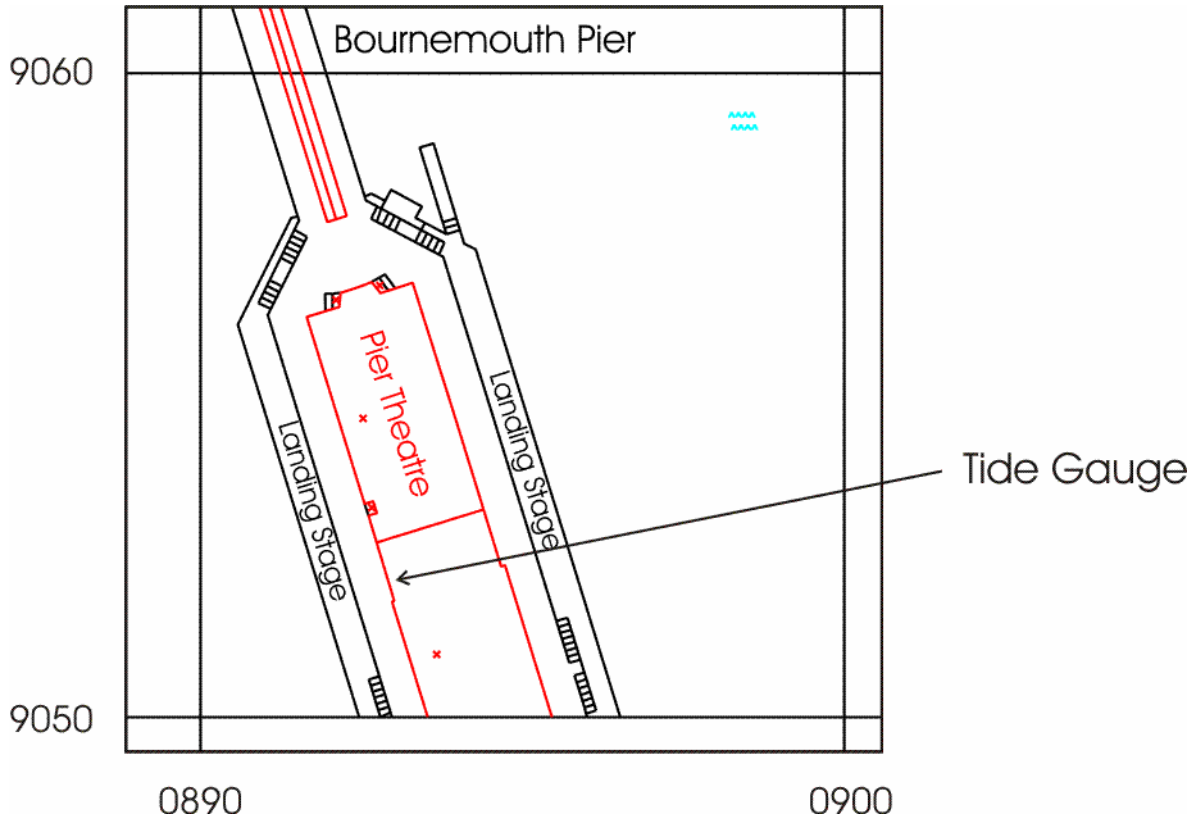
Site visits

15/10/2015 (Day 288) Maintenance. Fitted clamp and cable support bar to radar head. Fault with PSTN connection. Two problems found, slave BT socket gives dial tone but does not ring. PSTN modem was faulty. New PSTN modem fitted and BT extension fitted from master BT socket to the S500 panel.

Notes on Data Quality

The steelwork was damaged in a storm on 29 October 2013. A site visit by TGI on 05 November 2013 confirmed that the lower steelwork section was missing. A Vega radar gauge was installed on 03 September 2014 by TGI as part of resilience improvement work. There have been reports of unrealistic data from the radar gauge, but as there is no other sensor at the site, the cause of the issue cannot be diagnosed. Due to the exposed location of the site it would not be unrealistic to expect noise during certain weather conditions.

Bournemouth – Map & Images of Site



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Bournemouth – Statistics

Neither the Primary nor Secondary channel were operational during 2015, so no statistics were produced.

Cromer – Tide Gauge Information

Latitude 52° 56' 03.7" N **Longitude** 01° 18' 05.9" E **Grid Ref** TG 2198 4254

Instrument Underwater DQ transducer, a full-tide and a mid-tide bubbler gauge

Location **Tide Gauge Building** Within Cromer lifeboat station

Measuring Points Attached to a leg of the lifeboat slipway

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	TG 2193 4233	S Steel bolt on top of wall opposite E side of pier
Aux1	TG 2198 4253	Rivet on steps of catwalk NE angle of LB station
Aux2	TG 2195 4233	S Steel bolt bottom ramp S side at W corner

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 2.75m below Ordnance Datum Newlyn

TGZ = 10.117m below TGBM

Levelling Site was levelled on 12/05/2015

Site visits

15/01/2015 (Day 015) Site inspection of the underwater transducer and tubing.

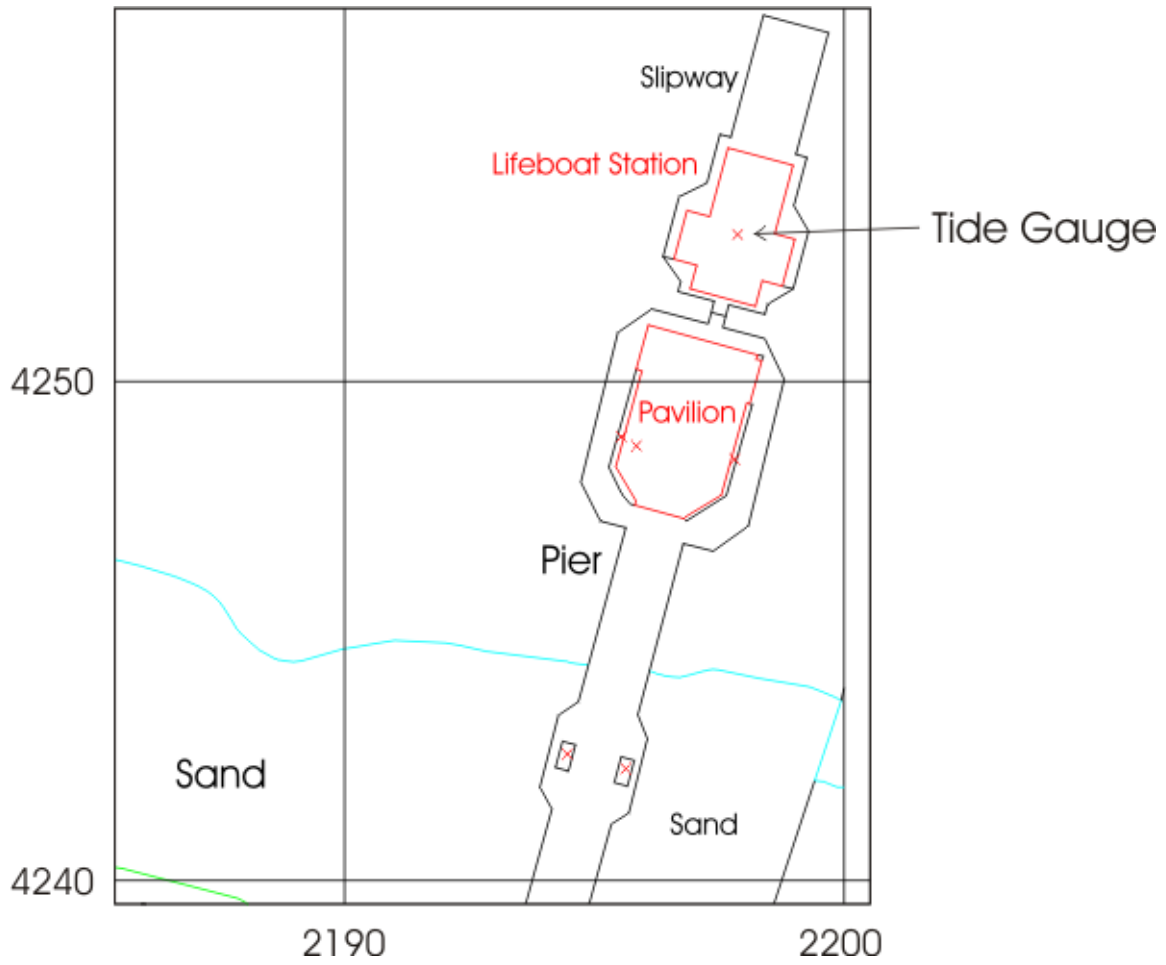
12/05/2015 (Day 132) Diving inspection and maintenance of underwater equipment.
Securing breather tube to TG steelwork. Levelling.

05/08/2015 (Day 217) Maintenance. Compressor change.

Notes on Data Quality

The site met the agreed target of being operational for at least 75% of each calendar month in 2015. However, Channel 2 was flagged extensively in April and May, possibly due to wave action in windy weather.

Cromer – Map & Images of Site



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Cromer – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	1.701	10	17:45:00	1.181	12	19:15:00	-1.133	15	04:00:00	-1.119	15	03:45:00
Feb	0.635	1	13:45:00	0.609	26	20:30:00	-1.088	22	18:45:00	-1.099	22	18:45:00
Mar	1.093	10	13:00:00	1.095	10	13:00:00	-1.053	12	19:45:00	-1.055	12	19:45:00
Apr	0.789	1	01:45:00	0.415	12	22:00:00	-0.401	8	18:45:00	-0.344	13	22:00:00
May	0.453	7	05:00:00	0.428	16	14:00:00	-0.343	23	19:15:00	-0.351	23	19:15:00
Jun	0.311	3	03:45:00	0.304	3	03:45:00	-0.888	2	02:30:00	-0.894	2	02:30:00
July	0.554	8	16:15:00	0.554	8	16:15:00	-0.31	9	21:45:00	-0.316	9	21:45:00
Aug	0.247	31	13:00:00	0.245	31	13:30:00	-0.294	21	07:45:00	-0.288	21	07:45:00
Sep	0.615	5	18:00:00	0.546	5	17:45:00	-0.386	28	15:15:00	-0.38	28	15:15:00
Oct	1.051	22	22:15:00	1.047	22	22:15:00	-0.549	23	12:15:00	-0.55	23	12:15:00
Nov	1.537	21	09:00:00	1.453	13	16:00:00	-0.731	28	17:30:00	-0.723	28	17:30:00
Dec	0.793	10	14:30:00	0.8	10	14:30:00	-1.356	30	07:15:00	-0.884	10	01:45:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	3.071	10	21:00:00	2.826	24	21:15:00	-2.433	23	03:00:00	-2.42	23	03:00:00
Feb	2.958	21	20:15:00	2.953	21	20:15:00	-2.474	23	03:45:00	-2.475	23	03:45:00
Mar	2.942	23	20:30:00	2.957	23	20:30:00	-2.663	22	02:30:00	-2.661	22	02:30:00
Apr	2.487	19	19:00:00	2.464	18	18:15:00	-2.396	20	02:00:00	-2.367	20	02:00:00
May	2.453	18	18:30:00	2.45	18	18:30:00	-2.085	18	00:45:00	-2.093	18	00:45:00
Jun	2.407	18	07:15:00	2.4	18	07:15:00	-2.429	2	00:45:00	-2.436	2	00:45:00
July	2.45	8	11:00:00	2.45	8	11:00:00	-2.139	4	14:30:00	-2.14	4	14:30:00
Aug	2.888	31	07:00:00	2.649	4	08:45:00	-2.375	3	15:15:00	-2.376	3	15:15:00
Sep	2.974	2	08:30:00	2.806	30	07:30:00	-2.506	29	14:00:00	-2.511	29	14:00:00
Oct	2.826	28	06:30:00	2.831	28	06:30:00	-2.308	29	14:30:00	-2.511	29	14:00:00
Nov	2.988	13	19:15:00	2.991	13	19:15:00	-2.175	26	13:00:00	-2.164	26	13:00:00
Dec	2.722	25	18:15:00	2.706	25	18:15:00	-2.398	24	12:15:00	-2.394	24	12:15:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.276	28	0.249
February	28	0.139	20	0.087
March	31	0.128	25	0.094
April	30	0.124	4	*
May	31	0.168	18	0.146
June	30	0.142	30	0.135
July	31	0.226	25	0.21
August	31	0.226	29	0.223
September	30	0.275	23	0.245
October	31	0.283	28	0.271
November	30	0.378	25	0.369
December	31	0.221	24	0.27
TOTAL & AVG	365	0.216	279	0.202

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Dover – Tide Gauge Information

Latitude 51° 06' 51.8" N **Longitude** 01° 19' 21.6" E **Grid Ref** TR 3265 4026

Instrument Data acquisition system with two full tide and a mid-tide bubbler gauge

Location **Tide Gauge Building** Prince of Wales Pier, Western Dock (just before the lighthouse)

Measuring Points Attached to the stilling well

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	TR 3193 4074	Fl Br G4868 building. East side of works entrance
Aux 1	TR 3195 4095	No 29 Waterloo Crescent SW face S angle
Aux 2	TR 3228 4053	Rivet pier wall NE side of pier F junction
Aux 3	TR 3265 4026	Rivet steps NE side P of W pier 1.0M SE W angle

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 3.67m below Ordnance Datum Newlyn (ODN)

TGZ = 10.491m below TGBM

Levelling No levelling was carried out in 2015

Site visits

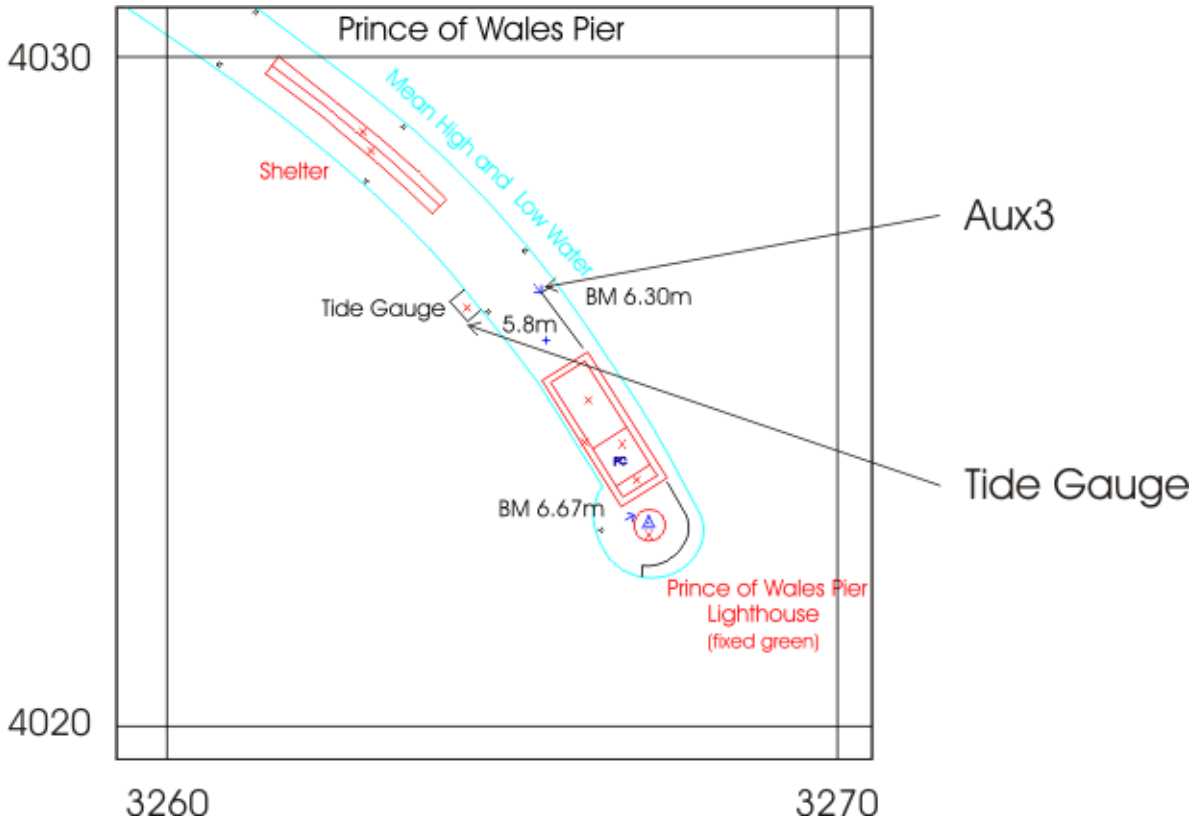
30/09/2015 (Day 273) Maintenance. Informed that the port will start work on the quayside leading to the tide gauge hut soon and there will be no access once work starts.

02/12/2015 (Day 336) Due to the start of harbour works the phone had to be disconnected and the system checked.

Notes on Data Quality

On 29 July 2014 the pressure points were found to be unusable and the pneumatic lines were terminated outside the pressure points to provide continuous operation. This had led to issues with the data and Channel 2 was reading ~60mm high for most of the year and was flagged accordingly.

Dover – Map & Images of Site



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Dover – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	0.986	13	01:30:00				-0.901	15	05:45:00			
Feb	0.525	14	03:00:00				-1.03	23	01:30:00			
Mar	0.792	31	16:00:00				-0.79	13	02:15:00			
Apr	0.591	1	04:45:00				-0.569	22	11:15:00			
May	0.599	5	09:45:00				-0.358	24	00:00:00			
Jun	0.312	1	05:30:00				-0.678	2	10:15:00			
July	0.547	25	16:30:00				-0.275	10	02:15:00			
Aug	0.368	25	16:00:00				-0.26	12	19:15:00			
Sep	0.443	17	11:00:00				-0.647	29	21:45:00			
Oct	0.61	23	01:30:00				-0.525	1	23:00:00			
Nov	0.904	13	20:30:00	0.905	13	20:30:00	-0.454	8	21:30:00	-0.449	29	00:30:00
Dec	0.757	23	06:45:00	0.757	23	06:45:00	-0.707	30	20:15:00	-0.704	30	20:15:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	3.499	24	13:45:00				-3.272	23	08:15:00			
Feb	3.67	21	00:15:00				-3.466	22	21:00:00			
Mar	3.596	24	01:15:00				-3.6	22	07:45:00			
Apr	3.316	19	23:30:00				-3.358	19	06:30:00			
May	3.268	18	23:15:00				-2.961	18	06:15:00			
Jun	3.121	18	12:00:00				-2.941	2	05:45:00			
July	3.137	5	13:15:00				-2.988	4	20:00:00			
Aug	3.617	31	11:45:00				-3.151	3	20:30:00			
Sep	3.681	1	12:30:00				-3.515	29	19:30:00			
Oct	3.566	28	11:00:00				-3.195	1	20:45:00			
Nov	3.521	13	23:45:00	3.521	13	23:45:00	-3.097	26	18:30:00	-3.095	26	18:30:00
Dec	3.291	28	00:15:00	3.291	28	00:15:00	-3.031	27	07:15:00	-3.029	27	07:15:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.154	0	*
February	28	0.006	0	*
March	31	0.003	0	*
April	30	0.004	0	*
May	31	0.072	0	*
June	30	0.027	0	*
July	31	0.123	0	*
August	31	0.129	0	*
September	30	0.15	0	*
October	31	0.157	0	*
November	30	0.254	20	0.274
December	15	*	15	*
TOTAL & AVG	349	0.100	35	**

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Fishguard – Tide Gauge Information

Latitude 52° 00' 47.6" N **Longitude** 04° 59' 01.5" W **Grid Ref** SM 9534 3918

Instrument Data acquisition system with two full tide and a mid-tide bubbler gauge

Location **Tide Gauge Building** On Fishguard Quay, adjacent to the RNLI station

Measuring Points Approximately 10m from the end of the quay

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	SM 9534 3918	OSBM bolt on quay 3.6M NE end of railings (1987)
Aux1	SM 9513 3874	OS bolt con base railings 6.4M NW angle TG hut
Aux2	SM 9489 3849	Rivet step top of Goodwick Quay
Aux3	SM 9455 3820	Fl Br 11518 building SW side railway bridge SE Face

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 2.44m below ODN

TGZ = 7.88m below TGBM

Levelling No levelling was carried out in 2015

Site visits

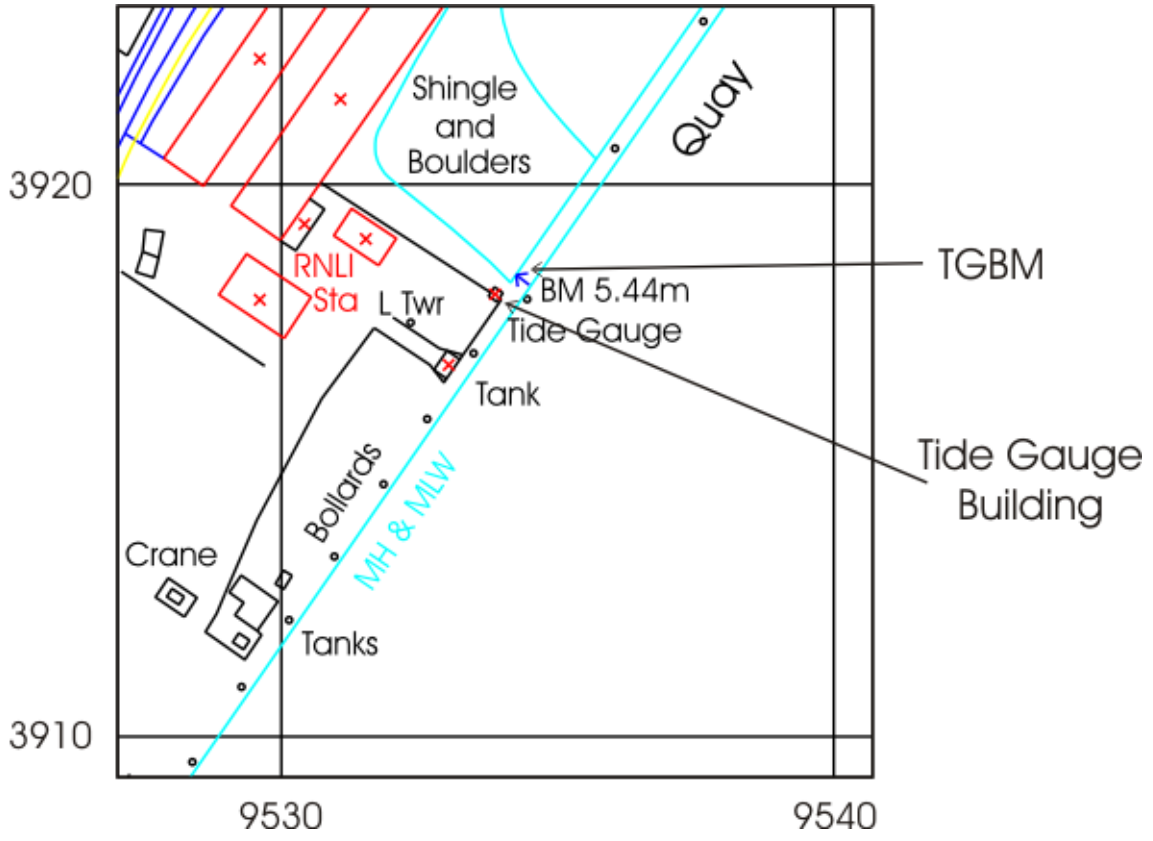
06/05/2015 (Day 126) Maintenance.

11/08/2015 (Day 223) Diving to remove silt from pressure points. The silt level was 50-75mm over the top of the pressure point.

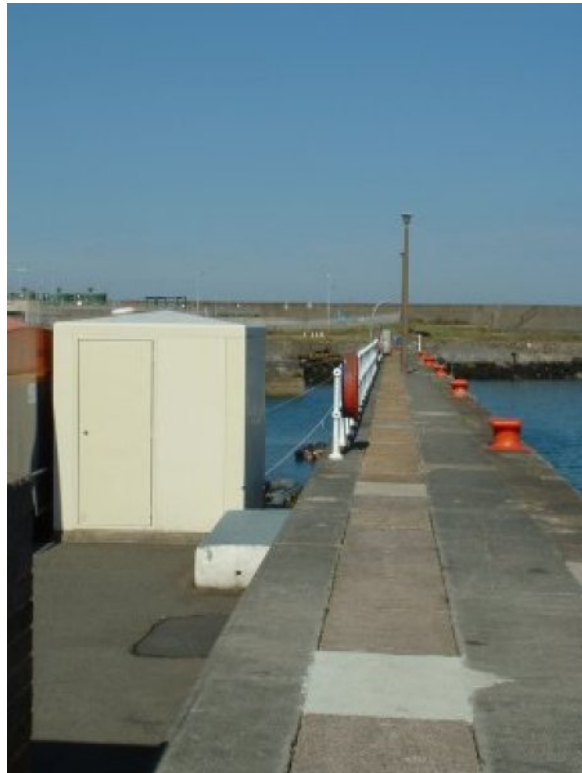
Notes on Data Quality

The site met the agreed target of being operational for at least 75% of each calendar month in 2015. The site suffers from siltation and the channels have been blocking throughout the year. Channel 1 has been flagged extensively in January and March to April, Channel 2 from June to August.

Fishguard – Map & Images of Site



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Fishguard – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	0.33	28	10:00:00	0.905	14	23:45:00	-0.279	2	15:00:00	-0.334	10	17:30:00
Feb	0.425	22	16:15:00	0.404	22	16:15:00	-0.343	6	22:00:00	-0.412	6	20:00:00
Mar	0.51	31	00:00:00	0.485	31	00:00:00	-0.349	13	11:30:00	-0.364	13	11:30:00
Apr	0.275	12	11:30:00	0.254	12	11:30:00	-0.255	12	22:15:00	-0.262	12	22:15:00
May	0.535	5	15:15:00	0.537	5	15:15:00	-0.19	24	17:45:00	-0.176	24	17:45:00
Jun	0.517	1	22:45:00	0.524	1	23:00:00	-0.325	8	20:45:00	-0.06	4	01:30:00
July	0.378	26	14:30:00				-0.062	15	12:30:00			
Aug	0.386	26	04:15:00	0.383	26	04:15:00	-0.102	12	16:30:00	-0.094	30	07:00:00
Sep	0.337	16	13:45:00	0.341	16	13:45:00	-0.294	29	15:15:00	-0.284	29	15:15:00
Oct	0.372	5	07:45:00	0.374	5	07:45:00	-0.248	13	01:30:00	-0.245	13	01:30:00
Nov	0.47	17	14:45:00	0.461	17	14:45:00	-0.64	21	11:00:00	-0.647	21	11:00:00
Dec	0.778	30	07:30:00	0.765	30	07:30:00	-0.25	4	01:45:00	-0.26	4	01:45:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	2.288	25	11:15:00	2.829	23	09:00:00	-2.014	22	15:15:00	-2.03	22	15:15:00
Feb	2.379	19	08:30:00	2.966	20	08:00:00	-2.142	21	15:30:00	-2.162	21	15:30:00
Mar	2.101	7	09:00:00	2.869	22	08:30:00	-2.314	21	14:15:00	-2.335	21	14:30:00
Apr	1.992	16	18:00:00	2.692	19	07:15:00	-2.021	21	03:00:00	-2.022	21	03:00:00
May	2.669	18	07:15:00	2.672	18	07:15:00	-1.776	20	02:45:00	-1.768	20	02:45:00
Jun	2.39	1	18:30:00	2.396	1	18:30:00	-1.617	7	04:30:00	-1.515	4	02:30:00
July	2.594	4	21:00:00				-1.641	5	03:30:00			
Aug	2.977	2	20:45:00	2.92	31	20:15:00	-2.087	31	02:15:00	-2.076	31	02:15:00
Sep	2.857	29	20:00:00	2.85	29	20:00:00	-2.319	30	02:45:00	-2.304	30	02:45:00
Oct	3.125	28	19:45:00	3.111	28	19:45:00	-2.021	1	03:30:00	-2.005	1	03:30:00
Nov	2.699	27	08:00:00	2.682	27	08:00:00	-1.969	26	01:15:00	-1.967	26	01:15:00
Dec	2.797	24	06:00:00	2.774	24	06:00:00	-1.427	12	01:45:00	-1.424	12	01:45:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	8	*	31	0.304
February	13	*	28	0.198
March	13	*	31	0.173
April	10	*	30	0.214
May	25	0.262	31	0.307
June	30	0.247	3	*
July	31	0.341	0	*
August	30	0.326	16	0.343
September	30	0.279	30	0.279
October	31	0.341	31	0.341
November	30	0.38	30	0.372
December	31	0.493	31	0.484
TOTAL & AVG	282	**	292	**

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Harwich – Tide Gauge Information

Latitude 51° 56' 52.8" N **Longitude** 01° 17' 31.7" E **Grid Ref** TM 2634 3284

Instrument Data acquisition system with two full tide and a mid-tide bubbler gauge
Location **Tide Gauge Building** Seaward end of Harwich Haven Authority jetty
Measuring Points On the jetty, directly below the tide gauge cabinet

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
 The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	TM 2634 3284	Bolt at base of flag staff
Aux1	TM 2617 3277	Cut mark quay edge
Aux2	TM 2608 3271	Cut mark NW face of Bank building
Aux3	TM 2610 3258	Cut mark N side of entrance St Nicholas's church

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 2.02m below ODN

TGZ = 6.17m below TGBM

Levelling No levelling was carried out in 2015

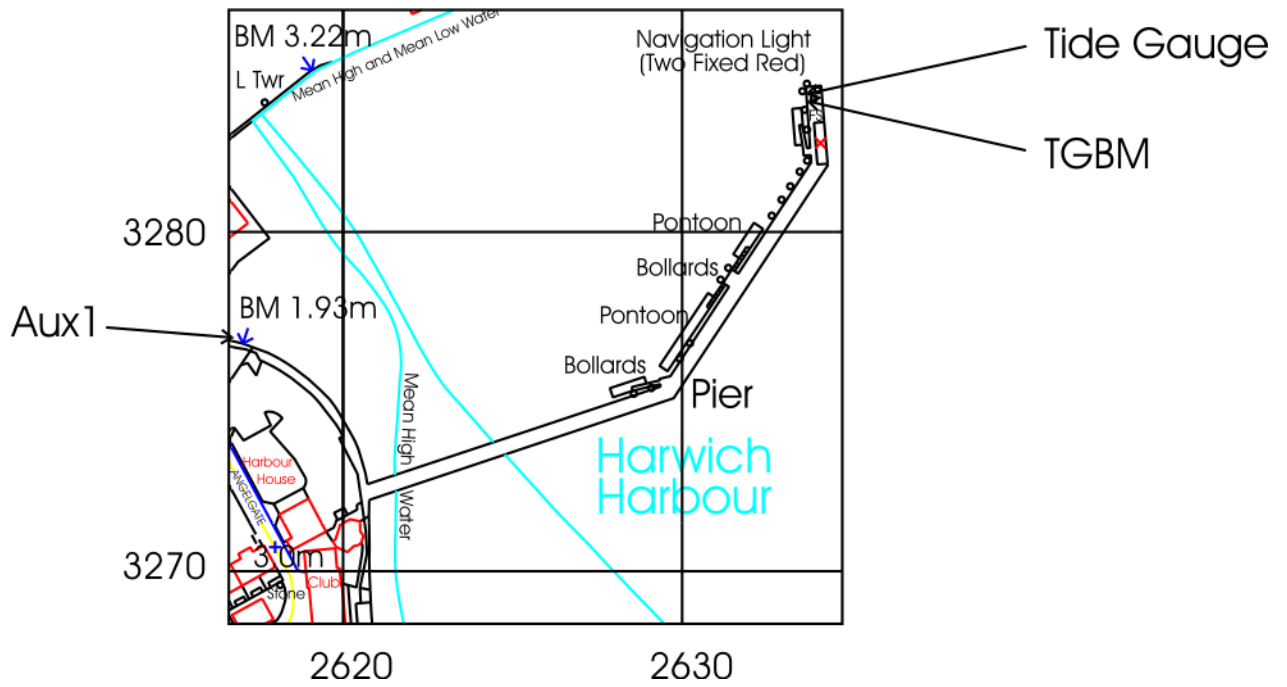
Site visits

- 14/01/2015 (Day 014) Both channels blocking. Due to the damp conditions caused by the heater not working the pneumatic panel has filled with condensation. This has been cleared as best as possible but the panel and pneumatic tubes require replacement.
- 14/05/2015 (Day 134) Diving inspection and maintenance of underwater equipment. Clear blocking channel.
- 06/08/2015 (Day 218) Maintenance. Compressor change.

Notes on Data Quality

Both full tide channels were blocking in January 2015 and TGI visited the site on 14 January. The heater on site was not functioning, which had led to damp conditions and the pneumatic panel had become filled with condensation. Channel 2 was unblocked but Channel 1 still had a restricted flow.

Harwich – Map & Images of Site



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Harwich – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan				0.962	16	16:45:00				-1.425	15	06:45:00
Feb				0.621	26	21:00:00				-0.969	22	23:15:00
Mar				1.072	10	17:00:00				-0.888	9	23:45:00
Apr	0.565	13	00:00:00	0.567	13	00:00:00	-0.374	18	10:30:00	-0.372	18	10:30:00
May	0.493	16	17:30:00	0.497	16	17:30:00	-0.401	6	14:15:00	-0.402	6	14:15:00
Jun	0.407	23	11:15:00	0.409	23	11:15:00	-0.736	2	06:15:00	-0.733	2	06:15:00
July	0.886	25	13:00:00	0.889	25	13:00:00	-0.236	17	14:00:00	-0.235	17	14:00:00
Aug	0.34	25	17:45:00	0.351	25	17:45:00	-0.317	26	16:00:00	-0.31	26	16:00:00
Sep	0.683	5	12:15:00	0.691	5	12:15:00	-0.446	28	23:15:00	-0.434	28	23:15:00
Oct	1.028	23	02:15:00	1.033	23	02:15:00	-0.424	23	18:15:00	-0.421	23	18:15:00
Nov	1.305	21	13:45:00	1.315	21	13:45:00	-0.618	8	23:15:00	-0.609	8	23:15:00
Dec	0.719	6	18:45:00	0.728	6	18:45:00	-1.161	30	16:15:00	-1.152	30	16:15:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan				2.418	24	14:30:00				-1.938	23	07:15:00
Feb				2.518	20	12:30:00				-1.972	22	20:15:00
Mar				2.368	10	14:45:00				-1.907	20	05:15:00
Apr	2.168	19	12:15:00	2.169	19	12:15:00	-1.94	19	05:30:00	-1.938	19	05:30:00
May	2.297	18	23:45:00	2.3	18	23:45:00	-1.804	16	03:45:00	-1.8	16	03:45:00
Jun	2.187	3	12:00:00	2.188	3	12:00:00	-2.039	2	05:00:00	-2.036	2	05:00:00
July	2.188	8	16:15:00	2.19	8	16:15:00	-1.768	17	18:30:00	-1.766	17	18:30:00
Aug	2.458	31	00:15:00	2.47	31	00:15:00	-1.942	3	19:45:00	-1.932	3	19:45:00
Sep	2.533	1	01:00:00	2.543	1	01:00:00	-1.951	28	17:30:00	-1.937	28	17:30:00
Oct	2.441	27	23:30:00	2.447	27	23:30:00	-1.751	28	18:00:00	-1.744	28	18:00:00
Nov	2.637	30	02:00:00	2.643	30	02:00:00	-1.74	26	17:30:00	-1.731	26	17:30:00
Dec	2.397	25	11:15:00	2.406	25	11:15:00	-1.98	30	10:00:00	-1.969	30	09:45:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	0	*	17	0.176
February	0	*	28	0.085
March	0	*	17	0.044
April	17	0.095	17	0.098
May	31	0.124	30	0.122
June	30	0.1	27	0.093
July	31	0.186	31	0.188
August	31	0.195	31	0.205
September	30	0.242	30	0.251
October	31	0.243	31	0.249
November	30	0.318	30	0.326
December	31	0.171	31	0.18
TOTAL & AVG	262	**	320	0.168

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Heysham – Tide Gauge Information

Latitude 54° 01' 54.6" N **Longitude** 02° 55' 12.9" W **Grid Ref** SD 3982 5993

Instrument Data acquisition system with two full tide and a mid-tide bubbler gauge

Location **Tide Gauge Building** South side of the entrance to Heysham harbour

Measuring Points Heysham harbour

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	SD 4030 6012	OSBM bolt on south quay 40.8m SW from SE angle of dock
Aux1	SD 4141 6005	Bridge parapet, E side of road
Aux2	SD 4026 6033	Pivot pin harbour wall 6.1M SW N angle of harbour
Aux3	SD 4026 6033	Rivet harbour wall 5.7M SW of N angle of Harbour
Aux4	SD 3982 5992	Brass bolt quay edge

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 4.90m below Ordnance Datum Newlyn (ODN)

TGZ = 12.098m below TGBM

Levelling No levelling was carried out in 2015

Site visits

06/01/2015 (Day 006) Investigate high readings on channel 2. Incorrect flow rate, adjusted and all channels checked - OK.

05/06/2015 (Day 156) Maintenance.

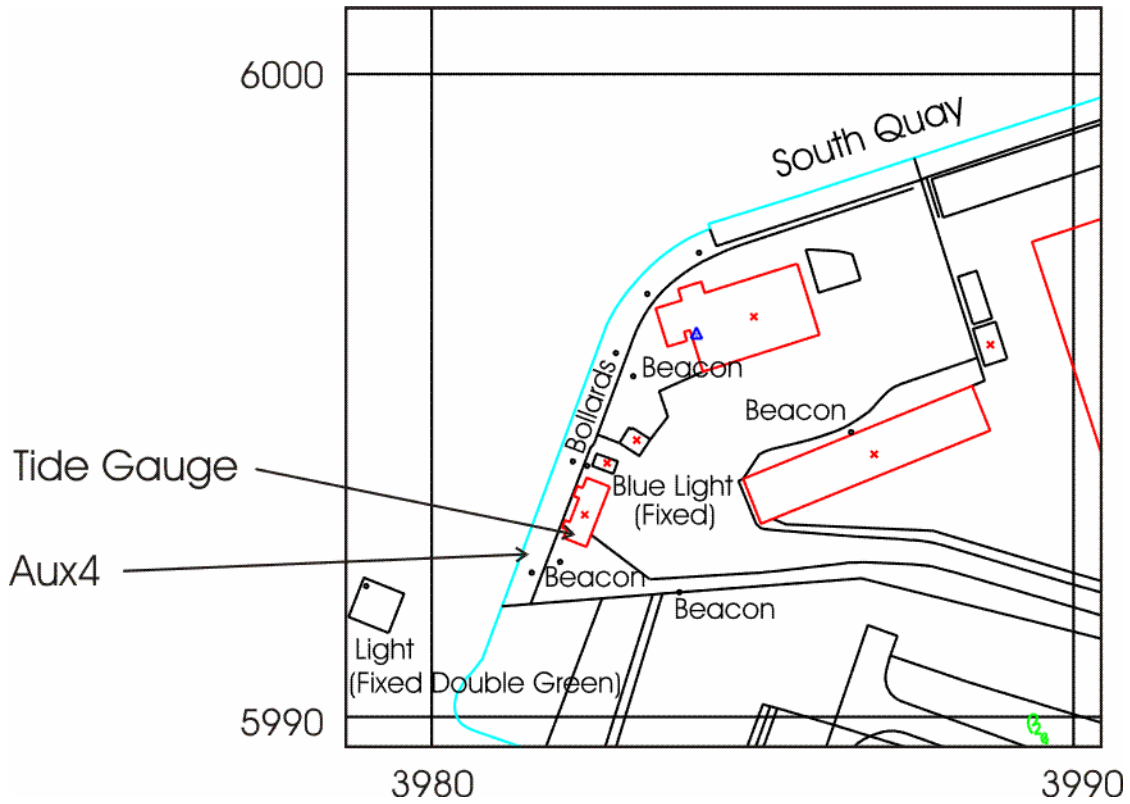
15/07/2015 (Day 196) Survey to replace damaged telemetry enclosure.

11/11/2015 (Day 315) Meeting with port electrician regarding the EA installation.
Photographs for EA detailing the electrical work required.

Notes on Data Quality

Channel 2 has been flagged from August to December and Channel 1 was flagged throughout. The pressure points at the site are blocking. The site is being dredged regularly.

Heysham – Map & Images of Site



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Heysham – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan				1.846	15	02:15:00				-0.48	31	18:30:00
Feb				0.988	23	19:30:00				-0.583	6	22:00:00
Mar				1.299	31	02:30:00				-0.495	13	15:45:00
Apr				1.255	12	11:30:00				-0.339	12	23:30:00
May				0.902	5	20:00:00				-0.237	27	01:30:00
Jun				1.271	1	20:15:00				-0.465	8	18:00:00
July				0.504	19	05:45:00				-0.202	16	08:15:00
Aug												
Sep	0.288	23	15:30:00	0.401	12	20:15:00	-0.469	30	09:30:00	-0.276	8	04:00:00
Oct	-0.165	1	05:45:00				-0.426	1	10:15:00			
Nov				1.052	8	18:15:00				0.072	8	11:15:00
Dec												

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan				5.669	23	13:00:00				-4.532	22	19:15:00
Feb				5.812	20	12:00:00				-4.548	20	19:00:00
Mar				5.702	22	12:30:00				-4.872	21	18:30:00
Apr				5.37	19	11:30:00				-4.517	19	18:15:00
May				5.32	18	11:00:00				-3.983	20	07:00:00
Jun				5.1	1	22:30:00				-3.715	18	06:45:00
July				5.059	5	01:00:00				-3.998	5	07:45:00
Aug												
Sep	5.61	30	00:00:00	4.656	13	23:30:00	-4.826	30	07:00:00	-3.404	14	06:15:00
Oct	5.448	1	00:45:00				-4.504	1	07:30:00			
Nov				4.605	9	10:00:00				-2.612	10	16:45:00
Dec												

	Mean Sea Level			
	Channel 1		Channel 2	
January	0	*	25	0.435
February	0	*	28	0.192
March	0	*	31	0.219
April	0	*	30	0.196
May	0	*	31	0.303
June	0	*	30	0.233
July	0	*	28	0.331
August	0	*	0	*
September	14	*	8	*
October	1	*	0	*
November	0	*	1	*
December	0	*	0	*
TOTAL & AVG	15	**	212	**

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Hinkley Point – Tide Gauge Information

Latitude 51° 12' 38.2" N **Longitude** 03° 07' 52.8" W **Grid Ref** ST 2107 4632

Instrument Dataring system with dual underwater pressure transducers

Location **Tide Gauge Building** Hinkley Point "A" power station

Measuring Points Underwater vented chambers suspended from a steel pole attached to a water intake tower (400m offshore)

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	ST 2104 4634	Bolt on wall 0.962m NE of SE corner of steps
Aux1	ST 2078 4626	Rivet on sea wall 41.28m SW of corner of outfall
Aux2	ST 2094 4631	Bolt on sea wall 31.245m SW of end of railings
Aux3	ST 2123 4634	Bolt sea defence wall

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 5.80m below Ordnance Datum Newlyn (ODN)

TGZ = 14.639m below TGBM

Levelling No levelling was carried out in 2015

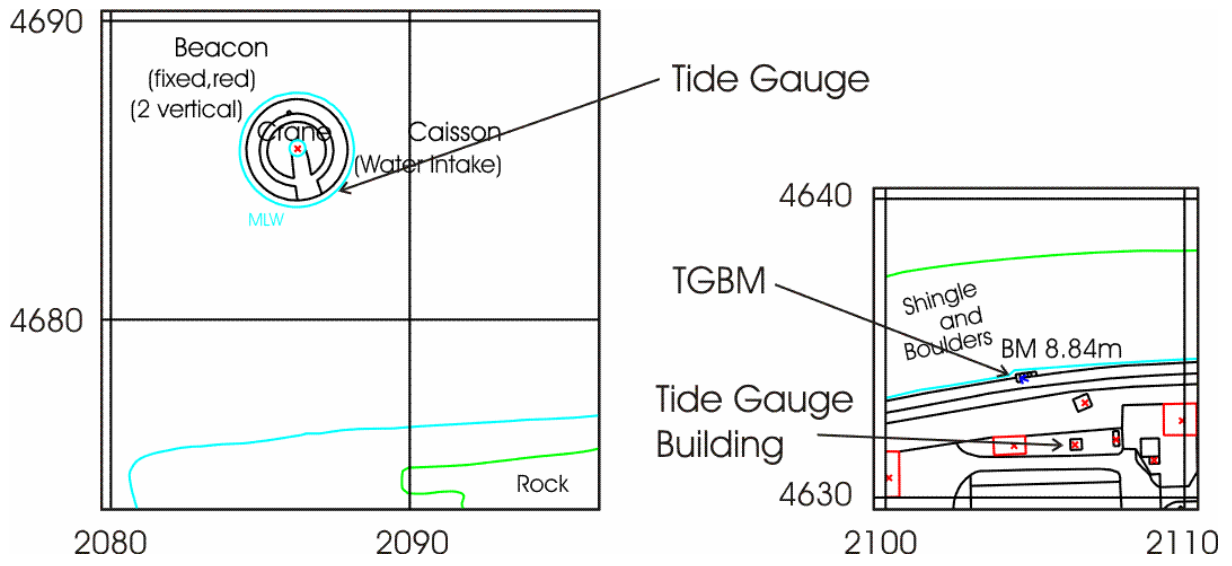
Site visits

11/06/2015 (Day 162) Maintenance. Installing high gain antenna as the current gsm signal strength is low. Testing PSTN line to confirm that a problem remains with the line - BT informed.

Notes on Data Quality

Channel 2 was flagged throughout the year due to issues with the sensor.

Hinkley Point – Map & Images of Site



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Hinkley Point – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	1.245	15	01:30:00				-0.802	30	10:15:00			
Feb	1	24	03:15:00				-0.504	6	05:00:00			
Mar	0.81	29	08:15:00				-0.429	18	18:30:00			
Apr	0.346	1	21:30:00				-0.321	22	03:15:00			
May	0.757	5	17:00:00				-0.328	24	18:15:00			
Jun	0.621	2	01:00:00				-0.449	10	11:15:00			
July	0.57	8	04:00:00				-0.202	31	07:30:00			
Aug	0.499	26	06:00:00				-0.237	29	07:15:00			
Sep	0.636	14	14:15:00				-0.51	30	04:45:00			
Oct	0.478	5	07:45:00				-0.363	1	05:45:00			
Nov	0.943	17	15:15:00				-0.76	21	10:00:00			
Dec	0.831	6	05:15:00	0.15	5	20:30:00	-0.279	2	18:15:00	0.095	5	21:00:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	6.766	23	08:45:00				-5.737	22	14:30:00			
Feb	7.197	21	08:30:00				-5.911	20	14:15:00			
Mar	7.038	22	08:15:00				-6.156	21	13:45:00			
Apr	6.691	20	07:45:00				-5.778	20	01:45:00			
May	6.457	18	19:00:00				-5.19	20	02:00:00			
Jun	5.787	4	20:00:00				-4.95	4	01:30:00			
July	6.202	4	20:30:00				-5.161	5	02:45:00			
Aug	7.108	31	20:00:00				-5.638	31	01:30:00			
Sep	7.039	29	19:45:00				-6.097	29	01:30:00			
Oct	7.164	28	19:15:00				-5.827	1	03:00:00			
Nov	6.564	27	07:15:00				-5.416	27	01:30:00			
Dec	6.38	26	07:00:00	1.837	5	21:00:00	-4.851	28	02:30:00	-2.007	5	20:30:00

	Mean Sea Level			
	Channel 1	Channel 2		
January	31	0.414	0	*
February	28	0.278	0	*
March	31	0.259	0	*
April	30	0.268	0	*
May	29	0.369	0	*
June	30	0.292	0	*
July	31	0.393	0	*
August	31	0.41	0	*
September	30	0.385	0	*
October	30	0.43	0	*
November	30	0.53	0	*
December	31	0.583	0	*
TOTAL & AVG	362	0.384	0	**

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Holyhead – Tide Gauge Information

Latitude 53° 18' 50.2" N **Longitude** 04° 37' 13.6" W **Grid Ref** SH 2553 8287

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge (back-up Munro float gauge disconnected)

Location **Tide Gauge Building** Salt Island jetty, close to the old harbour lighthouse
Measuring Points As above

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	SH 2553 8287	Bolt on concrete foundation, north side of tide gauge building
Aux1	SH 2556 8289	Cut mark lighthouse
Aux3	SH 2506 8292	Bolt Salt Island bridge

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 3.05m below Ordnance Datum Newlyn (ODN)

TGZ = 7.436m below TGBM

Levelling No levelling was carried out in 2015

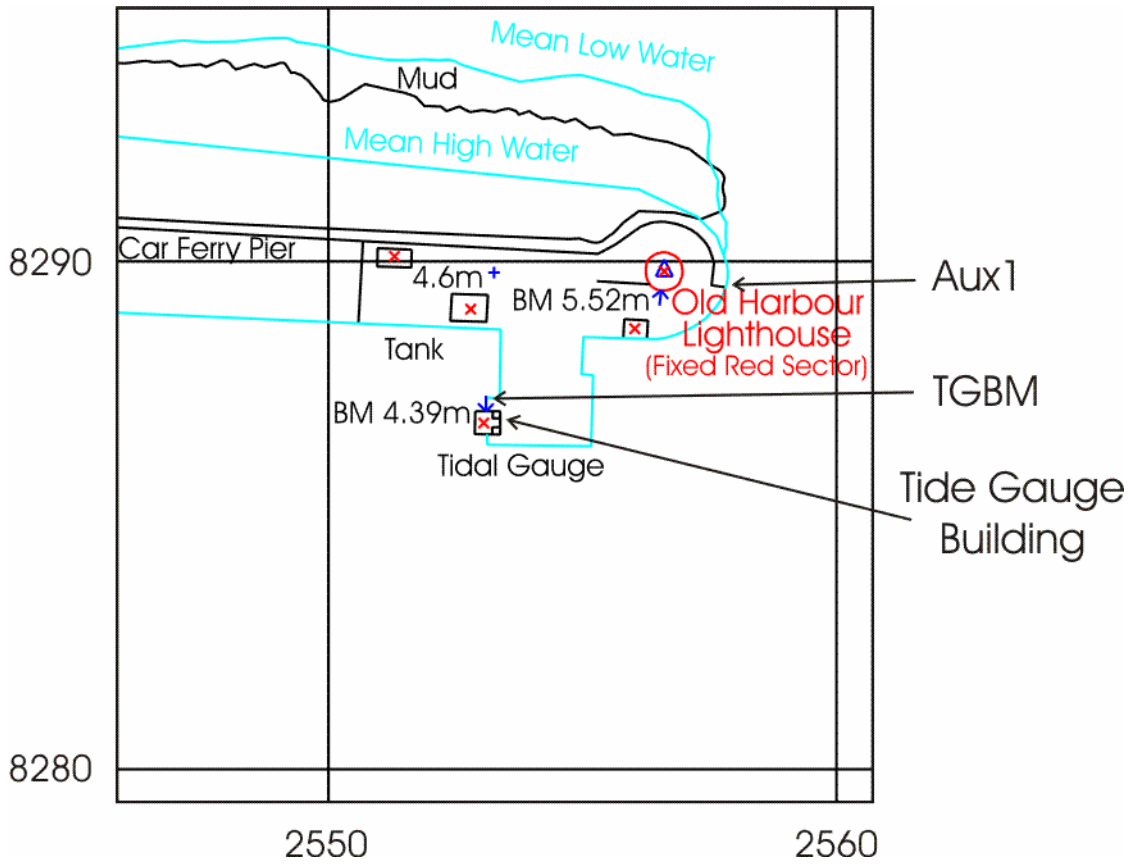
Site visits

08/03/2015 (Day 067)	Compressor change.
16/05/2015 (Day 136)	Maintenance. Clearing blocked Channel 2.
08/06/2015 (Day 159)	Calibration of the float gauge prior to removing the pen tape. This will be installed at Newlyn, the broken tape from Newlyn will be repaired and installed at Holyhead.
01/07/2015 (Day 182)	Clearing blocking channel.
12/08/2015 (Day 224)	Diving to clear blocked pressure points.
17/09/2015 (Day 260)	Survey for radar installation.
27/10/2015 (Day 300)	Channel 2 blocking, could not be cleared, channel 2 connected to the spare full tide pp.
15/11/2015 (Day 319)	Channel 2 producing unreliable data. The unloader valve on the compressor was sticking. Valve cleaned. All ok.

Notes on Data Quality

Channel 2 has been flagged from February to May and again from October to December. This was due to the pressure point blocking. In November and December Channel 1 was prone to lagging on the falling tide and was flagged.

Holyhead – Map & Images of Site



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Holyhead – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	1.133	15	00:45:00	1.13	15	00:45:00	-0.332	31	16:00:00	-0.324	31	16:00:00
Feb	0.584	28	23:15:00	0.098	2	21:00:00	-0.459	6	22:15:00	-0.435	6	22:15:00
Mar	0.697	31	00:30:00	0.392	26	06:00:00	-0.439	13	12:45:00	-0.311	8	19:00:00
Apr	0.448	12	10:30:00	0.279	25	09:00:00	-0.3	12	21:15:00	-0.202	22	00:00:00
May	0.537	5	17:15:00	0.287	31	07:15:00	-0.202	26	23:15:00	-0.22	26	23:15:00
Jun	0.712	1	21:15:00	0.713	1	21:15:00	-0.395	8	18:15:00	-0.412	8	18:15:00
July	0.309	6	21:15:00	0.306	6	21:15:00	-0.11	25	10:00:00	-0.12	25	10:00:00
Aug	0.407	26	07:45:00	0.392	26	07:45:00	-0.127	12	10:30:00	-0.149	12	10:30:00
Sep	0.292	16	13:45:00	0.273	16	13:45:00	-0.27	29	11:45:00	-0.275	29	12:30:00
Oct	0.459	29	06:15:00	0.451	29	06:15:00	-0.26	12	23:00:00	-0.222	1	13:15:00
Nov	0.699	17	18:30:00	0.683	17	18:30:00	-0.701	21	08:00:00	-0.713	21	08:00:00
Dec	1.147	30	07:45:00	1.14	30	07:45:00	-0.31	2	23:30:00	-0.315	2	23:30:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	3.162	23	12:15:00	3.168	23	12:15:00	-2.897	22	17:45:00	-2.918	22	17:45:00
Feb	3.222	22	12:45:00	2.393	3	10:15:00	-2.958	21	18:00:00	-2.438	5	17:30:00
Mar	3.072	22	11:30:00	2.922	23	12:45:00	-3.19	21	17:00:00	-3.192	21	17:00:00
Apr	2.904	19	10:30:00	2.455	22	00:30:00	-2.874	18	15:45:00	-2.666	21	18:00:00
May	2.921	18	10:15:00	2.92	18	10:15:00	-2.569	20	05:30:00	-2.596	20	05:30:00
Jun	2.971	1	21:30:00	2.965	1	21:30:00	-2.365	7	07:15:00	-2.392	7	07:15:00
July	2.88	7	01:45:00	2.88	7	01:30:00	-2.493	5	06:30:00	-2.506	5	06:15:00
Aug	3.208	3	00:00:00	3.211	2	23:45:00	-2.879	31	04:45:00	-2.908	31	04:45:00
Sep	3.086	28	22:30:00	3.112	28	22:15:00	-3.082	30	05:15:00	-3.09	30	05:15:00
Oct	3.394	28	22:45:00	3.394	28	22:45:00	-2.806	1	06:00:00	-2.813	1	06:00:00
Nov	3.017	27	11:00:00	3.021	27	11:00:00	-2.639	26	03:45:00	-2.656	26	03:45:00
Dec	3.135	24	09:00:00	3.141	24	09:00:00	-2.153	27	17:45:00	-2.159	27	17:45:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.287	31	0.28
February	28	0.136	10	*
March	31	0.135	0	*
April	30	0.137	6	*
May	31	0.234	14	*
June	26	0.173	25	0.136
July	31	0.262	29	0.253
August	31	0.287	31	0.276
September	30	0.238	26	0.26
October	29	0.308	12	*
November	19	0.374	19	0.327
December	11	*	11	*
TOTAL & AVG	328	0.259	214	**

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Ilfracombe – Tide Gauge Information

Latitude 51° 12' 40.1" N **Longitude** 04° 06' 44.6" W **Grid Ref** SS 5255 4789

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge

Location **Tide Gauge Building** North west corner of the car park, east of Lantern Hill

Measuring Points Seaward side of Ilfracombe pier at the harbour entrance

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	SS 5263 4791	OSBM Bolt on concrete pier, south angle of tide gauge hut
Aux1	SS 5245 4782	Pier Hotel, The Quay
Aux2	SS 5251 4789	St Nicholas chapel N face 6.1m from NW angle

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 4.80m below Ordnance Datum Newlyn (ODN)

TGZ = 12.379m below TGBM

TGZ = 10.76m below Aux1

TGZ = 32.541m below Aux2

Levelling No levelling was carried out in 2015

Site visits

26/02/2015 (Day 057) Maintenance. Flow rates found to be incorrect and the regulated pressure at 2.8 bar. Checks and adjustments carried out.

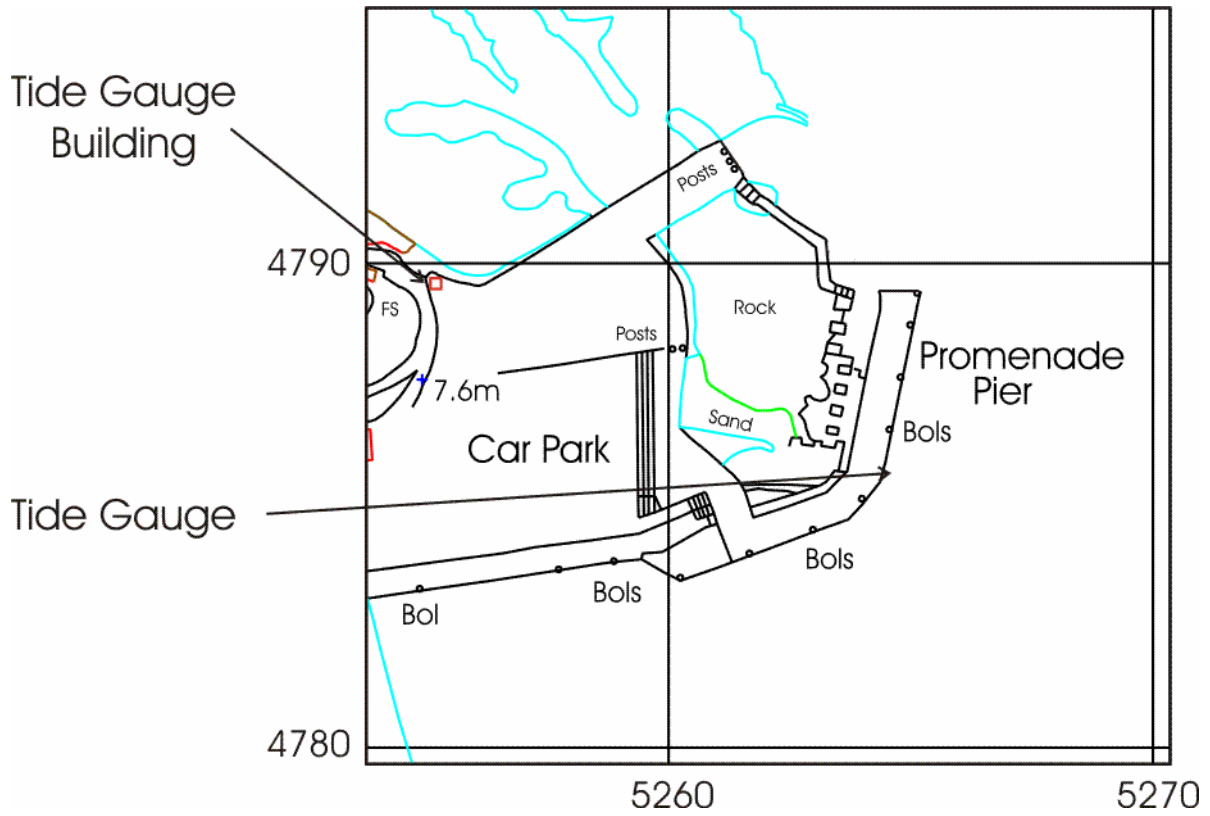
27/03/2015 (Day 086) Replace faulty GSM module and test.

09/09/2015 (Day 252) Maintenance. Compressor change.

Notes on Data Quality

The site met the agreed target of being operational for at least 75% of each calendar month in 2015. Channel 2 has been flagged from June to September and Channel 1 from November to December as it appeared to lose pressure.

Ilfracombe – Map & Images of Site



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Ilfracombe – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	0.96	15	00:15:00	0.971	15	00:15:00	-0.396	30	09:00:00	-0.384	30	09:00:00
Feb	0.638	24	02:00:00	0.64	24	01:45:00	-0.409	24	07:00:00	-0.349	6	17:30:00
Mar	0.471	30	18:30:00	0.474	30	18:30:00	-0.332	13	17:45:00	-0.329	13	17:45:00
Apr	0.268	29	02:15:00	0.273	29	02:15:00	-0.219	7	13:15:00	-0.219	7	13:15:00
May	0.674	5	16:00:00	0.679	5	16:00:00	-0.223	24	18:15:00	-0.222	24	18:15:00
Jun	0.485	1	17:30:00	0.49	1	17:30:00	-0.308	8	20:15:00	-0.304	8	20:15:00
July	0.383	26	13:15:00				-0.214	8	09:15:00			
Aug	0.471	26	04:30:00				-0.143	4	07:45:00			
Sep	0.449	16	13:30:00	0.46	16	13:30:00	-0.299	30	01:45:00	-0.322	29	04:00:00
Oct	0.45	5	07:30:00	0.469	5	07:30:00	-0.242	1	06:15:00	-0.228	2	07:15:00
Nov	0.452	7	08:15:00	0.743	17	13:30:00	-0.47	21	12:15:00	-0.316	26	02:15:00
Dec				0.731	31	13:45:00				-0.233	8	17:00:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	5.096	23	07:45:00	5.102	23	07:45:00	-4.517	22	13:15:00	-4.504	22	13:15:00
Feb	5.379	21	07:30:00	5.271	22	08:15:00	-4.733	20	13:00:00	-4.741	20	13:00:00
Mar	5.336	22	07:15:00	5.344	22	07:15:00	-4.839	21	12:30:00	-4.84	21	12:30:00
Apr	5.057	20	06:45:00	5.063	20	06:45:00	-4.575	20	13:00:00	-4.577	20	13:00:00
May	4.825	18	18:15:00	4.83	18	18:15:00	-4.068	18	11:45:00	-4.069	18	11:45:00
Jun	4.362	4	19:15:00	4.369	4	19:15:00	-3.809	17	12:15:00	-3.764	4	00:30:00
July	4.638	4	19:30:00				-3.997	5	01:45:00			
Aug	5.38	31	19:15:00				-4.564	31	00:30:00			
Sep	5.32	29	18:45:00	4.776	27	17:30:00	-4.815	30	00:45:00	-4.831	30	01:00:00
Oct	5.488	28	18:30:00	4.539	26	04:30:00	-4.59	1	01:30:00	-4.572	1	01:30:00
Nov	4.927	27	06:30:00	4.262	12	18:45:00	-4.301	26	11:45:00	-4.278	26	11:45:00
Dec				4.775	25	18:00:00				-3.636	27	00:45:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.22	31	0.23
February	28	0.102	22	0.096
March	31	0.095	31	0.099
April	29	0.131	30	0.135
May	31	0.216	31	0.219
June	30	0.132	15	0.13
July	29	0.196	0	*
August	31	0.229	0	*
September	27	0.202	17	0.315
October	25	0.25	22	0.266
November	10	*	17	0.385
December	0	*	26	0.429
TOTAL & AVG	302	**	242	**

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Immingham – Tide Gauge Information

Latitude 53° 37' 48.8" N **Longitude** 00° 11' 14.7" W **Grid Ref** TA 1996 1638

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge
Location **Tide Gauge Building** Entrance to Immingham Docks, east of the lock gates
Measuring Points Fixed to a leg of the lead-in jetty on the east side of the dock entrance

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
 The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	TA 1989 1630	Docks office, north angle, north east face
Aux1	TA 2005 1631	Customs house, east angle, north east face
Aux2	TA 1994 1640	Bolt on concrete base of tide gauge building
Aux3	TA 2000 1648	Stud in camera tower

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)
 TGZ = 3.90m below ODN
 TGZ = 9.131m below TGBM

Levelling No levelling was carried out in 2015

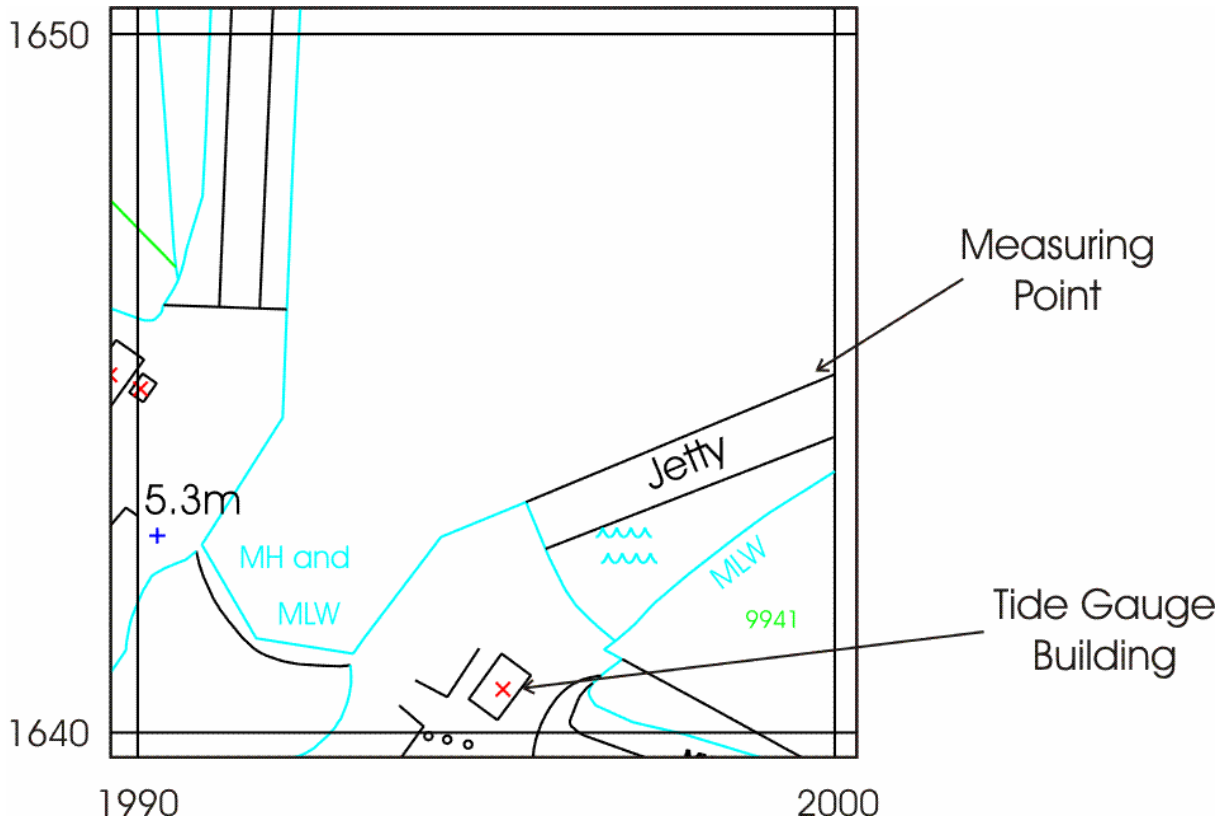
Site visits

06/10/2015 (Day 279) Maintenance. Compressor change. Repair damaged pneumatic line on channel 3.

Notes on Data Quality

The site was flooded in December 2013 which may have caused damaged to the pneumatic lines below the water line. The site now suffers from blocking and Channel 2 has been flagged throughout 2015, with Channel 1 flagged from October onwards. There were also reports of power failure at the site in July and September.

Immingham – Map & Images of Site



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Immingham – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	1.462	10	16:00:00				-0.997	9	05:30:00			
Feb	0.531	28	16:15:00				-0.99	22	20:30:00			
Mar	1.097	10	12:45:00				-0.958	11	18:15:00			
Apr	0.571	1	01:15:00				-0.432	8	17:15:00			
May	0.59	5	04:30:00	0.542	12	22:00:00	-0.293	23	20:15:00	-0.286	23	20:15:00
Jun	0.421	3	01:30:00	0.349	3	02:15:00	-0.629	2	00:15:00	-0.541	2	02:30:00
July	0.643	8	15:00:00	0.208	1	00:30:00	-0.234	17	20:15:00	-0.143	4	07:30:00
Aug	0.445	5	14:30:00				-0.215	21	06:30:00			
Sep	0.576	2	14:00:00				-0.301	28	19:15:00			
Oct	0.379	2	14:15:00				-0.243	1	19:45:00			
Nov												
Dec												

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	3.803	24	20:45:00				-3.471	23	02:00:00			
Feb	4.058	21	19:30:00				-3.384	21	01:45:00			
Mar	4.066	23	20:00:00				-3.707	22	01:30:00			
Apr	3.628	19	18:15:00				-3.388	20	01:00:00			
May	3.498	5	06:30:00	3.46	18	18:00:00	-2.991	17	23:45:00	-1.785	12	18:30:00
Jun	3.318	3	06:15:00	3.329	3	06:15:00	-2.987	1	23:45:00	-2.79	5	14:15:00
July	3.343	8	10:15:00	3.278	3	06:30:00	-2.922	31	12:00:00	-2.815	3	13:00:00
Aug	3.964	31	06:30:00				-3.354	3	14:30:00			
Sep	4.021	2	08:00:00				-3.571	29	13:00:00			
Oct	3.794	1	07:45:00				-3.17	1	14:30:00			
Nov												
Dec												

	Mean Sea Level			
	Channel 1	Channel 2		
January	31	0.359	0	*
February	28	0.246	0	*
March	31	0.223	0	*
April	30	0.24	0	*
May	31	0.29	0	*
June	30	0.259	5	*
July	26	0.36	2	*
August	31	0.366	0	*
September	28	0.39	0	*
October	5	*	0	*
November	0	*	0	*
December	0	*	0	*
TOTAL & AVG	271	**	7	**

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Isle of Islay (Port Ellen) – Tide Gauge Information

Latitude 55° 37' 39.3" N **Longitude** 06° 11' 23.7" W **Grid Ref** NR 3636 4508

Instrument Data acquisition system with two full-tide bubbler gauges. Decommissioned February 2011.

Location **Tide Gauge Building** Caledonian MacBrayne storeroom next to Port Ellen ferry terminal

Measuring Points South west of the ferry terminal offices

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	NR 3635 4507	Bolt SE side Booking Office
Aux1	NR 3642 4515	Rivet angle wall NW side entrance to pier
Aux2	NR 3651 4526	Police Station SE side of road SW face W angle
Aux3	NR 3635 4521	Sea Farm C gable NW face W angle

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 0.19m below Ordnance Datum Newlyn (ODN)

TGZ = 2.839m below TGBM

Levelling No levelling was carried out in 2015

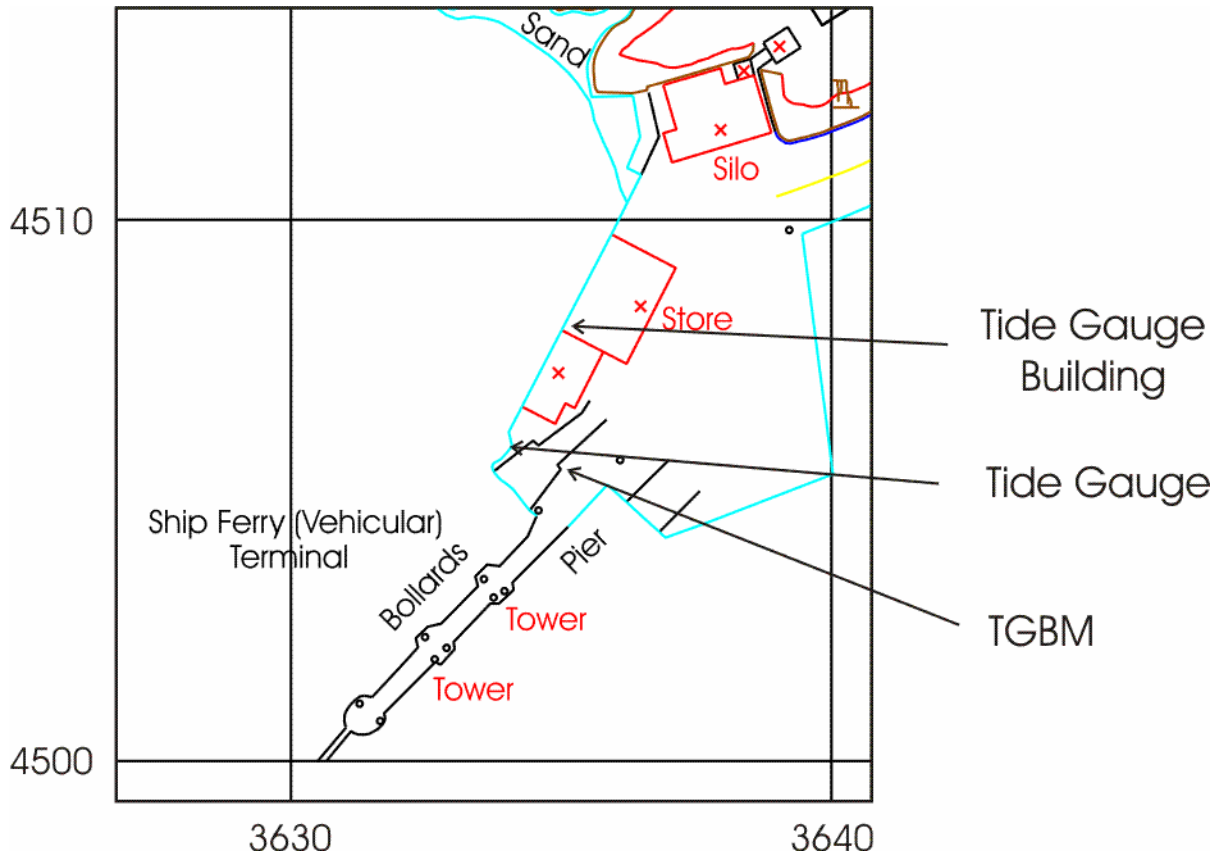
Site visits

No site visits were carried out in 2015

Notes on Data Quality

No data as gauge was removed from network due to harbour redevelopment on 08/02/2011.

Isle of Islay (Port Ellen) – Map & Images of Site



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Isle of Islay (Port Ellen) – Statistics

The gauge wasn't operational during 2015, so no statistics were produced.

Isle of Man (Port Erin) – Tide Gauge Information

Latitude 54° 05' 07.4" N **Longitude** 04° 46' 05.0" W **Grid Ref** SC 1904 6904

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge

Location **Tide Gauge Building** Port Erin lifeboat station

Measuring Points Close to the end of the lifeboat slipway (the mid-tide pressure point is attached to a concrete leg of the boathouse)

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Local (ODL).

Benchmark	Grid Ref	Description
TGBM	SC 1904 6901	Bolt SE corner of the RNLI boathouse
Aux 2		Bolt on seawall NW of Marine labs
Aux 3	SC 1928 6903	Bolt base of light tower Raglan pier

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 2.75m below Ordnance Datum Local (ODL)

TGZ = 9.288m below TGBM

Levelling No levelling was carried out in 2015

Site visits

04/03/2015 (Day 063) Maintenance. Compressor change.

14/07/2015 (Day 195) Maintenance.

Notes on Data Quality

The site met the agreed target of being operational for at least 75% of each calendar month in 2015.

Isle Of Man (Port Erin) – Map & Images of Site



Image: Isle of Man Government ©Google 2013



Isle Of Man (Port Erin) – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	1.236	15	03:15:00	1.239	15	03:15:00	-0.428	31	20:30:00	-0.42	31	20:15:00
Feb	0.687	28	23:15:00	0.689	28	23:15:00	-0.482	7	00:15:00	-0.476	7	00:15:00
Mar	0.781	31	01:30:00	0.786	31	01:30:00	-0.438	13	14:15:00	-0.429	13	14:15:00
Apr	0.402	12	13:00:00	0.411	12	13:00:00	-0.306	4	09:15:00	-0.298	4	09:15:00
May	0.504	5	19:00:00	0.508	5	19:00:00	-0.218	23	02:00:00	-0.214	23	02:00:00
Jun	0.787	1	20:45:00	0.792	1	20:30:00	-0.399	8	16:45:00	-0.397	8	16:45:00
July	0.39	6	23:00:00	0.393	6	23:00:00	-0.113	8	16:00:00	-0.11	8	16:00:00
Aug	0.429	4	07:30:00	0.431	4	07:00:00	-0.115	31	11:15:00	-0.111	31	11:15:00
Sep	0.278	16	10:30:00	0.282	16	10:30:00	-0.286	30	11:30:00	-0.281	30	11:30:00
Oct	0.481	29	06:15:00	0.486	29	06:15:00	-0.299	12	22:30:00	-0.295	12	22:30:00
Nov	0.744	12	20:15:00	0.75	12	20:15:00	-0.634	21	08:30:00	-0.63	21	08:30:00
Dec	1.109	30	07:30:00	1.114	30	07:30:00	-0.308	6	19:00:00	-0.305	6	18:45:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	3.145	23	13:00:00	3.15	23	13:00:00	-2.825	22	18:30:00	-2.819	22	18:30:00
Feb	3.305	22	13:30:00	3.31	22	13:30:00	-2.887	21	19:00:00	-2.882	21	19:00:00
Mar	2.976	22	12:30:00	2.984	22	12:30:00	-3.145	21	18:00:00	-3.137	21	18:00:00
Apr	2.766	19	11:30:00	2.771	19	11:30:00	-2.884	18	16:45:00	-2.878	18	16:45:00
May	2.828	18	11:00:00	2.832	18	11:00:00	-2.579	20	06:30:00	-2.575	20	06:30:00
Jun	2.92	1	22:30:00	2.922	1	22:30:00	-2.429	7	08:15:00	-2.425	7	08:15:00
July	2.887	7	02:30:00	2.891	7	02:30:00	-2.496	5	07:15:00	-2.491	5	07:15:00
Aug	3.154	4	01:30:00	3.157	4	01:30:00	-2.83	31	06:00:00	-2.826	31	06:00:00
Sep	3.041	1	00:15:00	3.044	1	00:15:00	-3.02	30	06:15:00	-3.016	30	06:15:00
Oct	3.314	28	23:45:00	3.319	28	23:45:00	-2.778	1	07:00:00	-2.774	1	07:00:00
Nov	3.068	27	12:00:00	3.072	27	12:00:00	-2.632	26	05:00:00	-2.628	26	05:00:00
Dec	3.142	24	10:00:00	3.146	24	10:00:00	-2.199	27	18:45:00	-2.195	27	18:45:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.238	31	0.243
February	28	0.069	28	0.075
March	31	0.068	31	0.075
April	30	0.053	30	0.059
May	31	0.157	31	0.161
June	30	0.096	30	0.1
July	31	0.193	31	0.196
August	31	0.223	31	0.227
September	30	0.155	30	0.159
October	31	0.237	31	0.241
November	30	0.343	30	0.347
December	31	0.494	31	0.499
TOTAL & AVG	365	0.194	365	0.199

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Jersey (St Helier) – Tide Gauge Information

Latitude 49° 10' 34" N **Longitude** 02° 06' 51 " W **Grid Ref** 13/11 6466 4763

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge
Location **Tide Gauge Building** Victoria Pier, adjacent to the Port Control building
Measuring Points inside wall of the pier, 2m from the tide gauge building

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
 The statistics in this report are to Ordnance Datum Local (ODL).

Benchmark	Grid Ref	Description
TGBM	13/11 6465 4764	Pin bollard Victoria Pier
Aux1	13/11 6516 4764	Cut mark wall N side of road Mount Bingham
Aux2	13/11 6509 4780	"J" stone E face wall car park South Hill
Aux3	13/11 6507 4779	Cut mark S face wall car park South Hill
Aux4	13/11 6506 4784	Cut mark E face wall E side Commercial Rd

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)
 TGZ = 5.88m below Ordnance Datum Local (ODL)
 TGZ = 13.658m below TGBM

Levelling No levelling was carried out in 2015

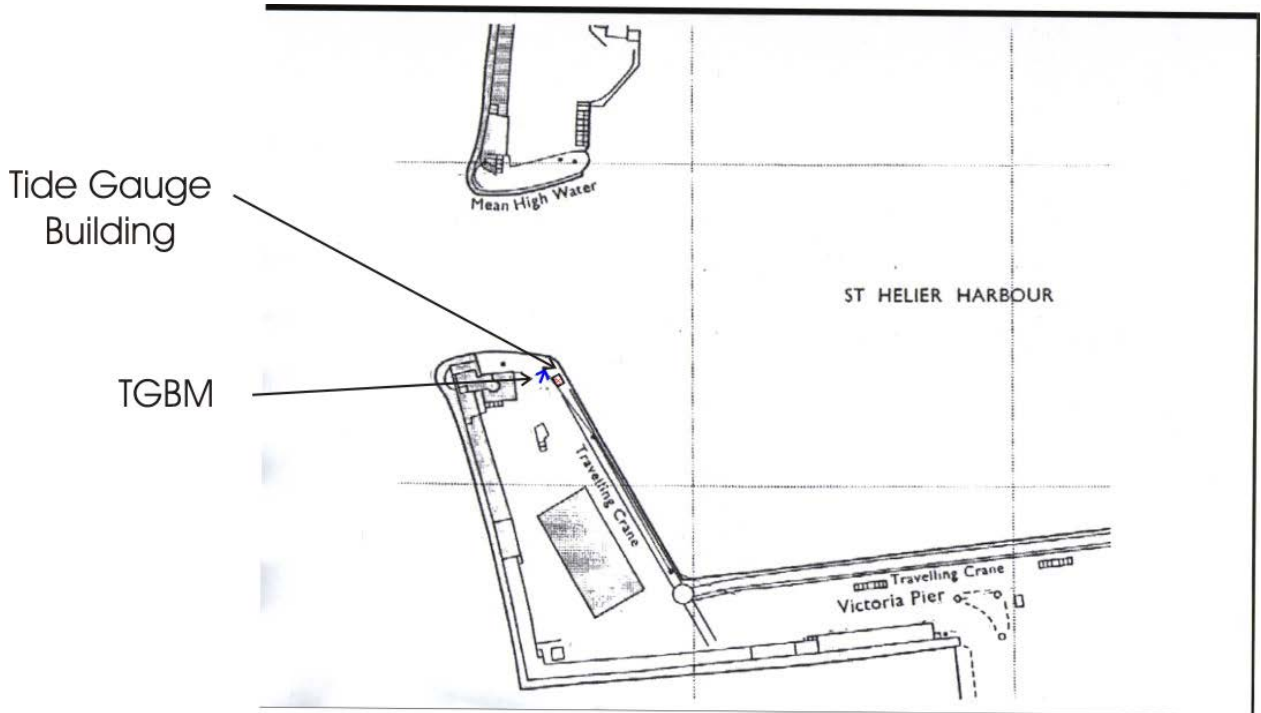
Site visits

No site visits were carried out in 2015

Notes on Data Quality

The site met the agreed target of being operational for at least 75% of each calendar month in 2015.

Jersey (St Helier) – Map & Images of Site



©States of Jersey 2013



Jersey (St Helier) – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	0.862	15	03:15:00	0.839	15	03:15:00	-0.56	25	07:15:00	-0.578	25	07:15:00
Feb	0.667	23	14:45:00	0.648	23	14:45:00	-0.631	6	17:30:00	-0.648	6	17:30:00
Mar	0.436	1	17:15:00	0.413	1	17:15:00	-0.506	5	03:30:00	-0.526	5	03:30:00
Apr	0.288	25	11:00:00	0.268	25	11:00:00	-0.476	7	05:15:00	-0.495	7	05:15:00
May	0.527	5	07:30:00	0.506	5	07:30:00	-0.305	23	18:00:00	-0.316	23	18:00:00
Jun	0.29	22	12:15:00	0.278	22	12:15:00	-0.531	9	07:45:00	-0.538	9	07:45:00
July	0.363	8	02:45:00	0.355	8	02:45:00	-0.258	9	09:00:00	-0.268	9	09:00:00
Aug	0.384	26	07:00:00	0.382	26	07:00:00	-0.239	1	16:45:00	-0.238	1	16:45:00
Sep	0.52	14	10:45:00	0.51	14	10:15:00	-0.572	29	17:15:00	-0.59	29	17:15:00
Oct	0.49	5	01:45:00	0.493	5	01:15:00	-0.465	1	18:30:00	-0.456	1	18:00:00
Nov	0.49	17	00:30:00	0.468	17	00:30:00	-0.425	26	03:15:00	-0.44	26	03:15:00
Dec	0.72	31	00:30:00	0.693	31	00:30:00	-0.251	9	03:45:00	-0.28	9	03:45:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	5.901	23	08:30:00	5.883	23	08:30:00	-5.372	23	15:15:00	-5.387	23	15:15:00
Feb	6.303	21	08:00:00	6.275	21	08:00:00	-5.639	20	14:15:00	-5.656	20	14:15:00
Mar	6.166	22	07:45:00	6.15	22	07:45:00	-5.813	21	13:45:00	-5.828	21	13:45:00
Apr	5.79	19	19:00:00	5.768	19	19:00:00	-5.44	19	13:30:00	-5.458	19	13:30:00
May	5.492	18	18:45:00	5.473	18	18:45:00	-4.735	20	02:15:00	-4.749	20	02:15:00
Jun	4.932	4	19:30:00	4.918	4	19:30:00	-4.444	4	01:45:00	-4.454	4	01:45:00
July	5.278	3	19:30:00	5.268	3	19:30:00	-4.755	5	03:00:00	-4.763	5	03:00:00
Aug	6.219	31	19:45:00	6.218	31	19:45:00	-5.329	31	01:45:00	-5.33	31	01:45:00
Sep	6.029	29	19:30:00	6.015	1	20:30:00	-5.766	30	02:15:00	-5.782	30	02:15:00
Oct	6.191	28	19:00:00	6.172	28	19:00:00	-5.396	1	02:45:00	-5.406	1	03:00:00
Nov	5.657	27	07:00:00	5.637	27	07:00:00	-4.989	26	13:00:00	-5.006	26	13:00:00
Dec	5.31	27	07:30:00	5.293	27	07:30:00	-4.446	27	14:15:00	-4.452	27	14:15:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.196	31	0.178
February	28	0.08	28	0.061
March	31	0.047	31	0.029
April	30	0.069	30	0.05
May	31	0.16	31	0.146
June	30	0.094	30	0.085
July	31	0.188	31	0.18
August	31	0.214	31	0.214
September	30	0.198	27	0.2
October	31	0.238	31	0.223
November	30	0.276	27	0.256
December	31	0.305	30	0.293
TOTAL & AVG	365	0.172	358	0.160

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Kinlochbervie – Tide Gauge Information

Latitude 58° 27' 23.8" N **Longitude** 05° 03' 01.3" W **Grid Ref** NC 2213 5608

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge

Location **Tide Gauge Building** In the ice plant, on the pier

Measuring Points On a leg of the jetty beneath the ice plant

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	NC 2206 5613	Bolt S side harbour 19.5M SE angle of building
Aux1	NC 2210 5612	Rivet iceplant 7.45M from S angle of building
Aux2	NC 2210 5614	Rivet inside iceplant 3.5M E door
Aux3	NC 2203 5626	Rivet 12.3M SE N angle of building
Aux4	NC 2213 5621	Rivet 2.5M NW inside corner NE steps

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 2.50m below Ordnance Datum Newlyn (ODN)

TGZ = 7.213m below TGBM

Levelling No levelling was carried out in 2015

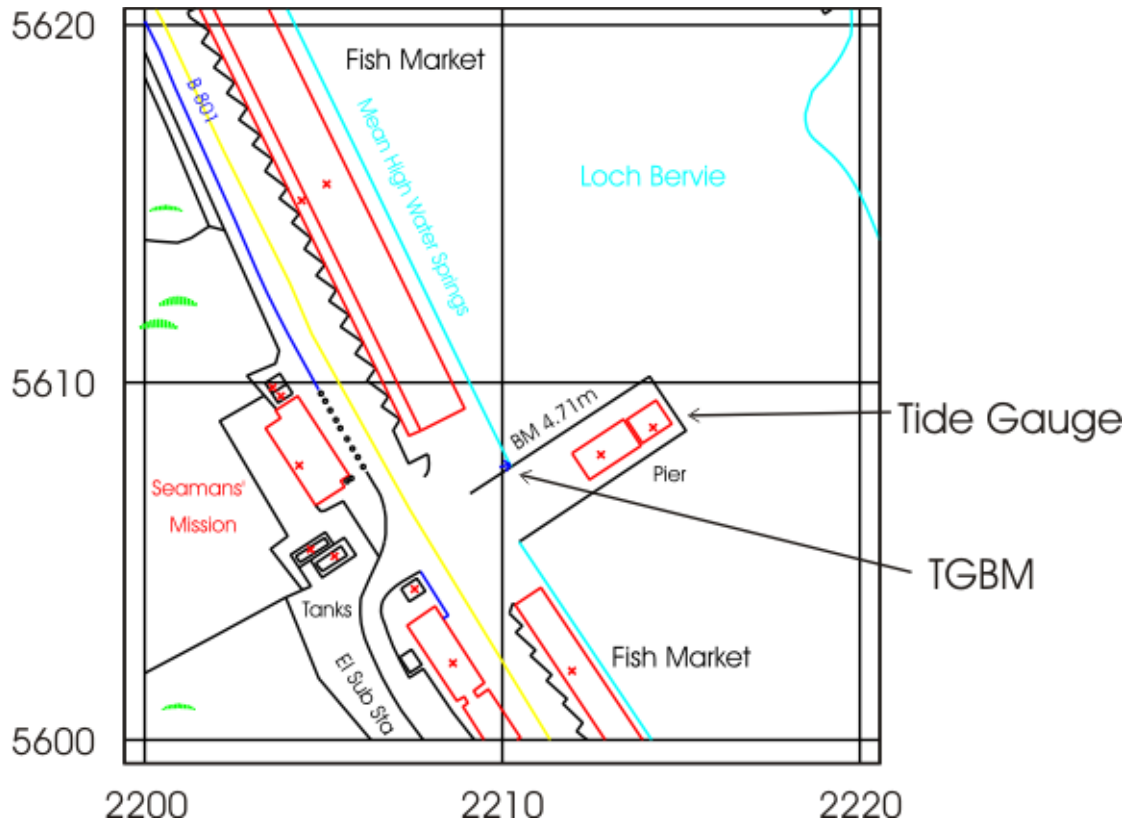
Site visits

No site visits were carried out in 2015

Notes on Data Quality

Channel 2 was flagged from January to February due to blocking.

Kinlochbervie – Map & Images of Site



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Kinlochbervie – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	1.177	9	03:30:00				-0.555	31	23:45:00			
Feb	0.684	23	13:30:00				-0.623	1	01:15:00			
Mar	1.094	9	22:00:00	1.087	9	22:00:00	-0.342	14	01:15:00	-0.344	14	01:15:00
Apr	0.353	14	03:15:00	0.352	14	00:30:00	-0.301	4	02:00:00	-0.304	4	02:00:00
May	0.643	11	23:30:00	0.639	11	23:30:00	-0.202	22	23:45:00	-0.208	22	23:45:00
Jun	0.554	2	06:00:00	0.549	2	06:00:00	-0.338	9	06:00:00	-0.34	9	06:00:00
July	0.394	21	03:45:00	0.393	21	03:45:00	-0.139	8	17:45:00	-0.139	8	17:45:00
Aug	0.501	4	17:15:00	0.5	4	17:15:00	-0.13	31	08:00:00	-0.131	31	08:00:00
Sep	0.262	13	09:00:00	0.261	24	13:15:00	-0.27	30	09:45:00	-0.27	30	09:45:00
Oct	0.608	22	05:15:00	0.608	22	05:15:00	-0.254	13	03:00:00	-0.254	13	03:00:00
Nov	1.108	13	02:30:00	1.108	13	02:30:00	-0.47	22	05:30:00	-0.47	22	05:30:00
Dec	0.882	30	05:30:00	0.882	30	05:30:00	-0.251	7	07:30:00	-0.251	7	07:30:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	3.076	23	09:00:00				-2.307	22	14:45:00			
Feb	3.144	20	07:45:00				-2.424	21	15:00:00			
Mar	2.998	9	21:30:00	2.994	9	21:30:00	-2.741	21	14:15:00	-2.744	21	14:15:00
Apr	2.556	19	07:30:00	2.555	19	07:30:00	-2.468	18	13:00:00	-2.47	18	13:00:00
May	2.644	18	07:00:00	2.642	18	07:00:00	-2.052	20	02:30:00	-2.057	20	02:30:00
Jun	2.512	5	21:15:00	2.5	5	21:15:00	-1.801	4	02:15:00	-1.814	4	02:15:00
July	2.637	31	19:00:00	2.631	31	19:00:00	-2.017	4	02:45:00	-2.018	4	02:45:00
Aug	2.94	3	21:30:00	2.937	3	21:30:00	-2.408	31	02:00:00	-2.409	31	02:00:00
Sep	2.958	28	19:15:00	2.958	28	19:15:00	-2.597	30	02:15:00	-2.598	30	02:15:00
Oct	3.07	28	19:45:00	3.07	28	19:45:00	-2.371	1	03:15:00	-2.371	1	03:15:00
Nov	2.964	27	07:30:00	2.963	27	07:30:00	-2.15	26	01:00:00	-2.154	26	01:00:00
Dec	3.067	24	06:00:00	3.067	24	06:00:00	-1.76	26	13:45:00	-1.762	26	13:45:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.564	0	*
February	28	0.355	0	*
March	31	0.37	25	0.341
April	30	0.264	30	0.262
May	31	0.369	31	0.365
June	30	0.309	30	0.306
July	31	0.377	31	0.377
August	31	0.451	31	0.45
September	30	0.363	30	0.362
October	31	0.482	31	0.481
November	30	0.621	30	0.621
December	31	0.751	31	0.751
TOTAL & AVG	365	0.440	300	**

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Leith – Tide Gauge Information

Latitude 55° 59' 23.4"N **Longitude** 03° 10' 54.1"W **Grid Ref** NT 2638 7806

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge

Location **Tide Gauge Building** Lead-in jetty, east of the entrance to Leith docks

Measuring Points As above

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	NT 2643 7797	OSBM Bolt SE end of TG pier 0.9m N angle of pier
Aux1	NT 2648 7797	Rivet on top step SW side of road 1.6m S angle of building
Aux2	NT 2653 7789	Rivet top step SW side of road 11.9M W angle of building

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 2.90m below Ordnance Datum Newlyn (ODN)

TGZ = 7.84mm below TGBM

Levelling No levelling was carried out in 2015

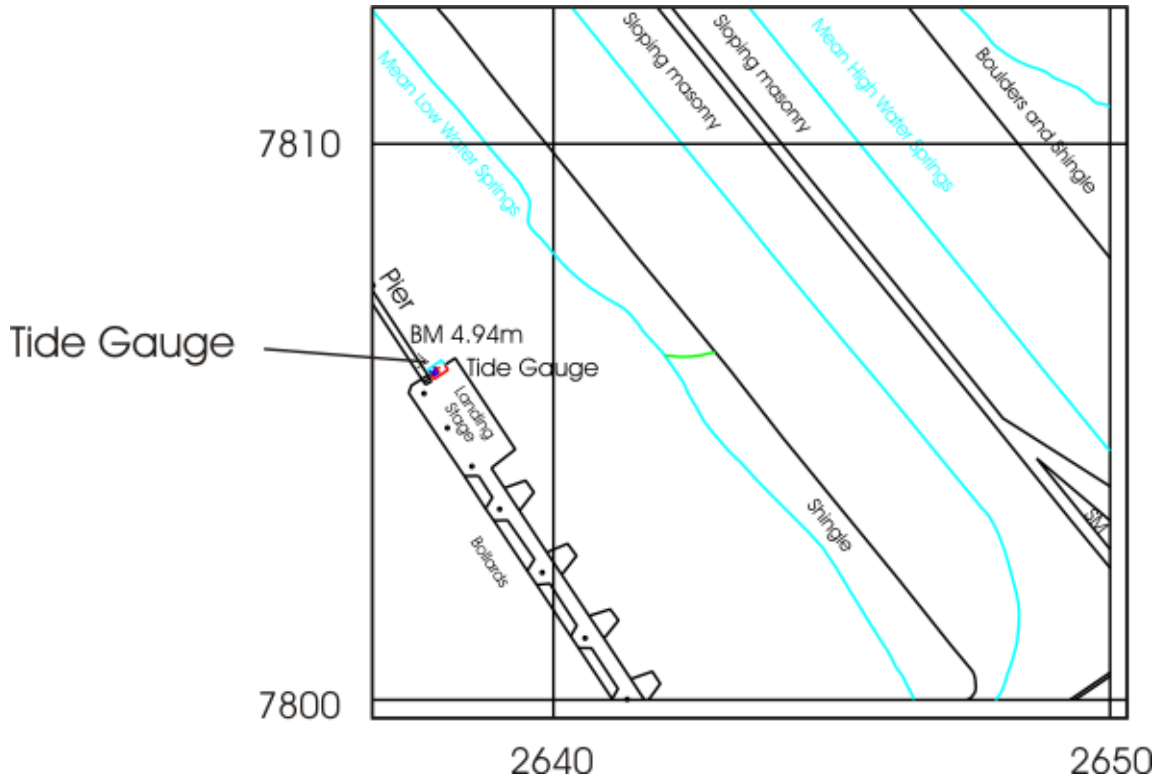
Site visits

21/05/2015 (Day 141) Maintenance.

Notes on Data Quality

The site met the agreed target of being operational for at least 75% of each calendar month in 2015.

Leith – Map & Images of Site



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Leith – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	1.026	10	17:45:00	1.029	10	17:45:00	-0.783	9	05:15:00	-0.778	9	05:15:00
Feb	0.488	28	13:00:00	0.49	28	13:00:00	-0.456	8	04:30:00	-0.455	8	04:30:00
Mar	1.033	10	08:30:00	1.035	10	08:30:00	-0.871	9	20:30:00	-0.868	9	20:30:00
Apr	0.443	1	00:00:00	0.445	1	00:00:00	-0.369	4	10:15:00	-0.365	4	10:15:00
May	0.464	5	00:45:00	0.465	5	00:45:00	-0.211	23	06:45:00	-0.209	23	06:45:00
Jun	0.445	3	01:30:00	0.446	3	01:30:00	-0.325	9	02:00:00	-0.324	9	02:00:00
July	0.388	27	09:45:00	0.393	27	09:45:00	-0.212	18	04:45:00	-0.209	18	04:45:00
Aug	0.311	26	20:00:00	0.314	26	20:00:00	-0.12	3	16:00:00	-0.118	3	16:00:00
Sep	0.349	17	09:45:00	0.353	17	09:45:00	-0.315	12	21:45:00	-0.311	12	21:45:00
Oct	0.764	22	17:45:00	0.766	22	17:45:00	-0.34	23	07:15:00	-0.337	23	07:15:00
Nov	1.075	13	11:15:00	1.081	13	11:15:00	-0.611	8	19:45:00	-0.606	8	19:45:00
Dec	0.797	22	05:00:00	0.801	22	05:00:00	-0.61	4	21:45:00	-0.606	4	21:45:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	3.206	10	17:45:00	3.209	10	17:45:00	-2.853	22	22:15:00	-2.849	22	22:15:00
Feb	3.329	21	16:15:00	3.331	21	16:15:00	-2.774	20	22:00:00	-2.769	20	22:00:00
Mar	3.263	23	16:30:00	3.265	23	16:30:00	-3.14	21	21:30:00	-3.138	21	21:30:00
Apr	2.916	19	15:00:00	2.918	19	15:00:00	-2.847	18	20:30:00	-2.845	18	20:30:00
May	3.038	18	14:30:00	3.04	18	14:30:00	-2.307	17	20:00:00	-2.305	17	20:00:00
Jun	2.776	3	02:30:00	2.778	3	02:30:00	-2.241	6	11:00:00	-2.237	6	11:00:00
July	2.786	5	17:00:00	2.788	5	17:00:00	-2.371	4	10:00:00	-2.369	4	10:00:00
Aug	3.243	31	03:00:00	3.245	31	03:00:00	-2.813	31	09:45:00	-2.81	31	09:45:00
Sep	3.28	2	04:45:00	3.282	2	04:45:00	-2.976	29	09:15:00	-2.974	29	09:15:00
Oct	3.35	28	02:30:00	3.348	28	02:30:00	-2.583	1	10:30:00	-2.58	1	10:30:00
Nov	3.275	27	15:30:00	3.278	27	15:30:00	-2.448	26	08:30:00	-2.444	26	08:30:00
Dec	3.205	25	14:15:00	3.208	25	14:15:00	-2.111	28	22:30:00	-2.108	28	22:30:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.351	31	0.355
February	28	0.204	28	0.206
March	31	0.198	31	0.201
April	30	0.196	30	0.198
May	31	0.271	31	0.274
June	30	0.222	28	0.219
July	31	0.308	31	0.311
August	31	0.339	31	0.342
September	30	0.318	30	0.32
October	31	0.367	31	0.369
November	30	0.472	30	0.474
December	31	0.472	31	0.475
TOTAL & AVG	365	0.310	363	0.312

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Lerwick – Tide Gauge Information

Latitude 60° 09' 14.5" N **Longitude** 01° 08' 25.1" W **Grid Ref** HU 4783 4137

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge
Location **Tide Gauge Building** Inner wall at breakwater entrance to the small boat harbour, south of Victoria Pier
Measuring Points As above

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Local (ODL).

Benchmark	Grid Ref	Description
TGBM	HU 4783 4129	OSBM bolt on breakwater wall
Aux1	HU 4784 4125	Queen's Hotel 7.5m SW face south angle
Aux2	HU 4777 4110	Lerwick Parish Church North face NW angle

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)
TGZ = 1.22m below Ordnance Datum Local (ODL)
TGZ = 4.57m below TGBM

Levelling No levelling was carried out in 2015

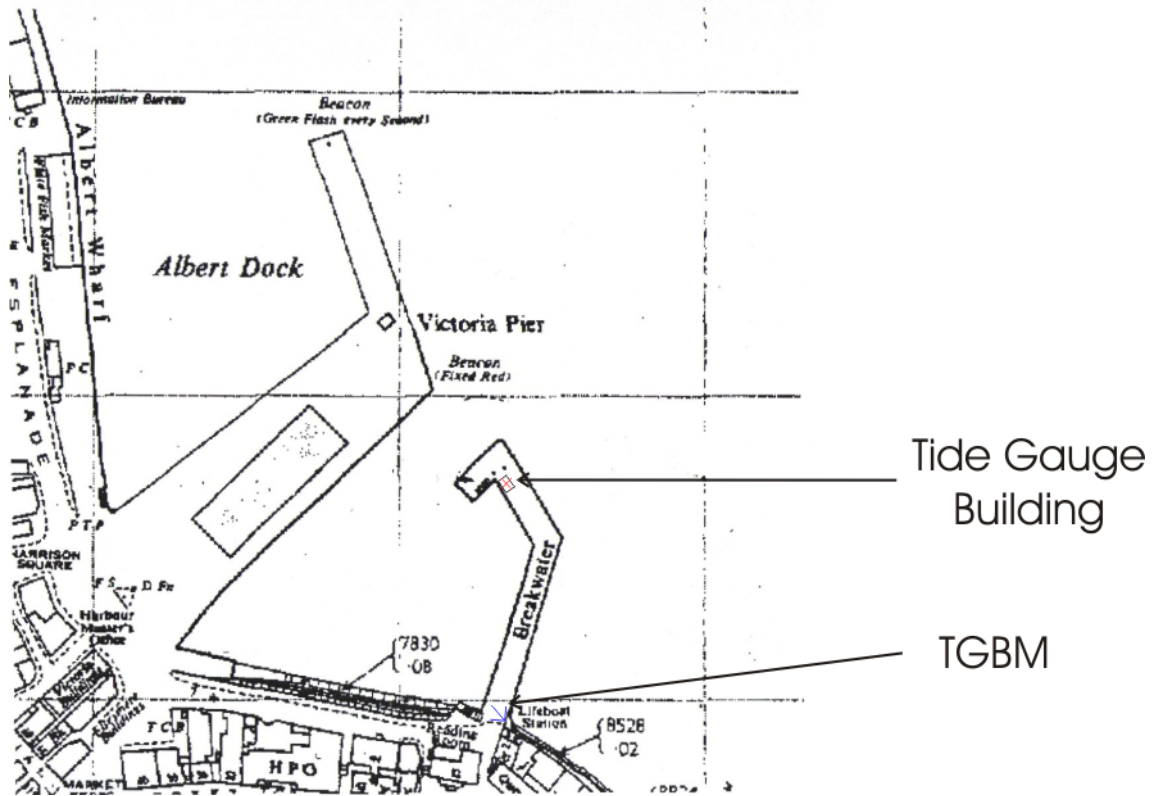
Site visits

18/03/2015 (Day 077) Maintenance.
01/12/2015 (Day 335) Maintenance. Compressor change.

Notes on Data Quality

The site met the agreed target of being operational for at least 75% of each calendar month in 2015.

Lerwick – Map & Images of Site



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Lerwick – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	0.704	12	20:15:00	0.712	12	20:15:00	-0.323	31	21:00:00	-0.314	31	21:00:00
Feb	0.414	23	06:30:00	0.422	23	06:30:00	-0.362	6	05:15:00	-0.354	6	05:15:00
Mar	0.441	1	03:00:00	0.451	1	03:00:00	-0.292	15	05:45:00	-0.283	15	05:45:00
Apr	0.252	14	08:00:00	0.261	14	08:00:00	-0.208	18	22:45:00	-0.201	18	22:45:00
May	0.377	12	08:45:00	0.385	12	08:45:00	-0.091	23	07:30:00	-0.083	23	07:30:00
Jun	0.305	2	03:00:00	0.313	2	03:00:00	-0.231	8	18:15:00	-0.223	8	18:15:00
July	0.248	2	23:45:00	0.255	2	23:45:00	-0.238	2	05:00:00	-0.228	2	05:00:00
Aug	0.246	27	12:15:00	0.255	27	12:15:00	-0.106	17	21:00:00	-0.097	17	21:00:00
Sep	0.213	16	16:30:00	0.221	16	16:30:00	-0.238	28	08:30:00	-0.23	28	08:30:00
Oct	0.397	22	10:15:00	0.406	22	10:15:00	-0.214	13	05:30:00	-0.207	13	05:30:00
Nov	0.603	9	06:00:00	0.612	9	06:00:00	-0.233	22	14:30:00	-0.226	22	14:30:00
Dec	0.601	22	08:45:00	0.589	22	08:45:00	-0.18	15	06:00:00	-0.182	15	04:15:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	1.327	10	14:15:00	1.335	10	14:15:00	-1.113	22	18:15:00	-1.105	22	18:15:00
Feb	1.409	23	14:00:00	1.418	23	14:00:00	-1.038	6	18:30:00	-1.031	6	18:30:00
Mar	1.353	23	12:45:00	1.36	23	12:45:00	-1.386	21	17:30:00	-1.378	21	17:30:00
Apr	0.878	19	11:15:00	0.886	19	11:15:00	-1.252	18	16:45:00	-1.244	18	16:45:00
May	1.087	18	10:45:00	1.095	18	10:45:00	-0.943	20	06:00:00	-0.933	20	06:00:00
Jun	1.045	2	22:45:00	1.053	2	22:45:00	-0.974	8	08:45:00	-0.967	8	08:45:00
July	1.119	2	23:45:00	1.126	2	23:45:00	-1.02	2	05:00:00	-1.01	2	05:00:00
Aug	1.23	30	23:15:00	1.239	30	23:15:00	-1.101	3	06:30:00	-1.094	3	06:30:00
Sep	1.144	1	00:00:00	1.153	1	00:00:00	-1.219	29	05:15:00	-1.21	29	05:15:00
Oct	1.3	28	23:15:00	1.309	28	23:15:00	-0.968	1	06:30:00	-0.96	1	06:30:00
Nov	1.498	13	11:45:00	1.507	13	11:45:00	-0.808	23	02:00:00	-0.8	26	04:45:00
Dec	1.473	25	10:30:00	1.454	25	10:30:00	-0.812	26	17:30:00	-0.825	26	17:30:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.247	31	0.256
February	28	0.06	28	0.068
March	31	0.042	31	0.051
April	30	-0.014	30	-0.005
May	31	0.067	31	0.075
June	30	0.011	30	0.019
July	31	0.079	31	0.088
August	31	0.115	31	0.123
September	30	0.081	30	0.09
October	31	0.156	31	0.165
November	30	0.337	30	0.343
December	30	0.355	27	0.353
TOTAL & AVG	364	0.128	361	0.136

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Liverpool – Tide Gauge Information

Latitude 53° 26' 58.9" N **Longitude** 03° 01' 04.8" W **Grid Ref** SJ 3249 9525

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge

Location **Tide Gauge Building** In the old Lock Keeper's office at the entrance to Gladstone Dock

Measuring Points Seaward side of Gladstone Dock

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	SJ 3249 9525	NBM rivet NE face E angle base of building
Aux1	SJ 3250 9523	Rivet E side of quay above hinge SW dock gate
Aux2	SJ 3244 9538	Building wall E face SE angle
Aux3	SJ 3294 9558	Rivet concrete adjacent to building No 335

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 4.93m below Ordnance Datum Newlyn (ODN)

TGZ = 14.475m below TGBM

Levelling Site was levelled on 22/05/2015

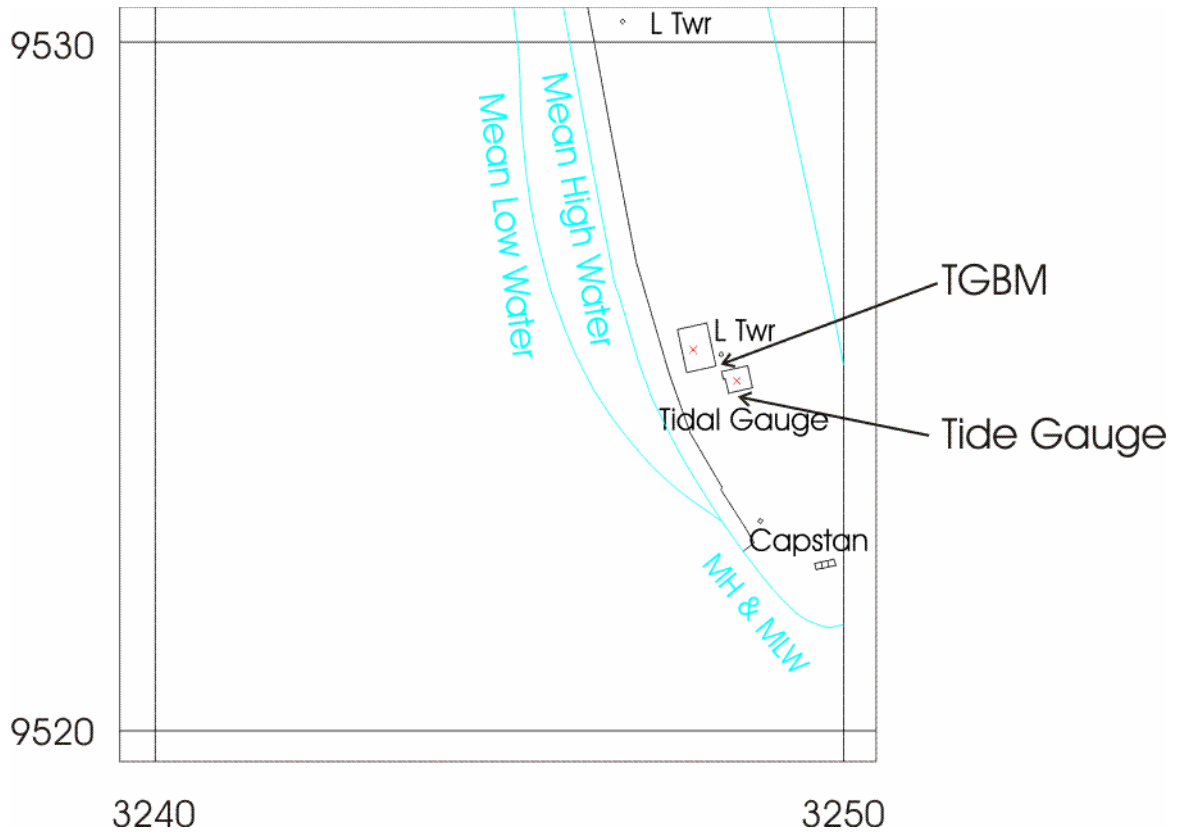
Site visits

- 07/01/2015 (Day 007) Site meeting with Warrington EA to resolve differences. They are connected to channel 2, which is not the transfer channel - reconnected to channel 1. Lines purged as there are signs the PPs are silting up.
- 11/02/2015 (Day 042) Migration of telemetry equipment from old to new building, installation of new pneumatic system and rerouting of pneumatic lines into new building. System commissioning.
- 20/03/2015 (Day 079) Meeting on site with Warrington EA, BT and AMCO (rectify problems with wiring). Compressor changed.
- 30/04/2015 (Day 120) Open Reach installing phone lines.
- 22/05/2015 (Day 142) BT repairing fault to phone lines. Levelling.
- 10/06/2015 (Day 161) Meeting BT at site for building access.
- 24/06/2015 (Day 175) Meeting with BT at site - Engineer didn't turn up.
- 01/09/2015 (Day 244) Site survey on very low spring - 0.27m @ 0722
- 30/10/2015 (Day 303) Maintenance. Survey of port works.
- 17/11/2015 (Day 321) Visit to check on the phone line (not working) and on the port works in the vicinity of the gauge.

Notes on Data Quality

Channel 1 has been flagged throughout the year. The pressure points are blocking due to silt, possibly as a result of the ongoing harbour works.

Liverpool – Map & Images of Site



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Liverpool – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	1.749	15	01:15:00	1.829	15	01:30:00	-0.353	3	19:15:00	-0.344	30	04:00:00
Feb	0.975	23	21:00:00	0.973	23	21:00:00	-0.479	6	21:15:00	-0.479	6	21:15:00
Mar	0.859	28	13:30:00	1.406	31	03:45:00	-0.294	21	07:30:00	-0.458	10	10:45:00
Apr	0.923	12	10:45:00	1.136	12	12:30:00	-0.235	12	23:15:00	-0.25	3	19:00:00
May	0.752	6	09:00:00	0.854	5	19:30:00	-0.131	23	01:15:00	-0.139	23	01:15:00
Jun	0.541	1	18:15:00	1.082	1	20:45:00	0.486	1	17:45:00	-0.314	8	19:00:00
July	0.414	27	03:45:00	0.554	19	08:15:00	0.089	28	08:00:00	-0.133	16	08:30:00
Aug				0.588	4	08:15:00				-0.107	12	09:15:00
Sep				0.451	12	18:45:00				-0.439	30	08:15:00
Oct				0.58	5	12:30:00				-0.306	1	09:30:00
Nov	0.499	30	11:30:00	1.583	17	21:30:00	-0.202	30	03:45:00	-0.59	21	08:30:00
Dec	0.741	6	07:30:00	1.386	30	10:00:00	-0.338	3	00:30:00	-0.378	3	00:30:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	4.571	7	12:15:00	5.343	23	13:00:00	-3.941	20	17:45:00	-4.507	22	19:30:00
Feb	5.32	19	11:00:00	5.466	21	12:30:00	-4.345	21	07:15:00	-4.547	20	19:15:00
Mar	5.246	23	13:00:00	5.345	22	12:15:00	-4.882	21	18:45:00	-4.899	21	18:45:00
Apr	5.104	19	11:15:00	5.087	19	11:15:00	-4.502	18	17:30:00	-4.51	18	17:30:00
May	5.055	18	11:00:00	5.048	18	11:00:00	-3.834	17	17:15:00	-3.843	17	17:15:00
Jun	-1.649	1	18:15:00	4.886	1	22:15:00	-2.696	1	17:15:00	-3.643	18	06:45:00
July	2.917	28	08:00:00	4.783	5	00:45:00	0.409	28	05:15:00	-3.959	5	07:45:00
Aug				5.274	30	23:30:00				-4.525	31	06:45:00
Sep				5.408	1	00:15:00				-4.825	30	07:15:00
Oct				5.471	28	23:30:00				-4.466	1	07:45:00
Nov	4.609	23	21:00:00	5.319	29	13:30:00	-3.752	25	04:45:00	-4.125	26	18:00:00
Dec	3.335	6	07:30:00	4.983	26	11:15:00	-2.415	2	22:30:00	-3.603	27	19:15:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	6	*	15	*
February	2	*	25	0.325
March	1	*	31	0.342
April	10	*	30	0.333
May	13	*	29	0.437
June	0	*	30	0.381
July	0	*	31	0.449
August	0	*	31	0.458
September	0	*	30	0.397
October	0	*	22	0.423
November	0	*	30	0.631
December	0	*	31	0.713
TOTAL & AVG	32	**	335	0.465

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Llandudno – Tide Gauge Information

Latitude 53° 19' 54.0" N **Longitude** 03° 49' 30.8" W **Grid Ref** SH 7855 8319

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge

Location **Tide Gauge Building** A sub-platform under the pavilion at the end of Llandudno pier

Measuring Points A leg of the pier below the tide gauge building

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	SH 7834 8292	Rivet stone butt gate entrance
Aux1	SH 7827 8255	OSBM bolt concrete step SE side of slipway
Aux2	SH 7840 8243	OSBM bolt bottom concrete step
Aux3	SH 7864 8229	OSBM bolt concrete ramp 6.5M NW C slipway

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 3.85m below Ordnance Datum Newlyn (ODN)

TGZ = 12.558m below TGBM

Levelling No levelling was carried out in 2015

Site visits

10/03/2015 (Day 069) Maintenance. Compressor Change.

19/03/2015 (Day 078) Charger for compressor battery had failed - replaced and system checked OK.

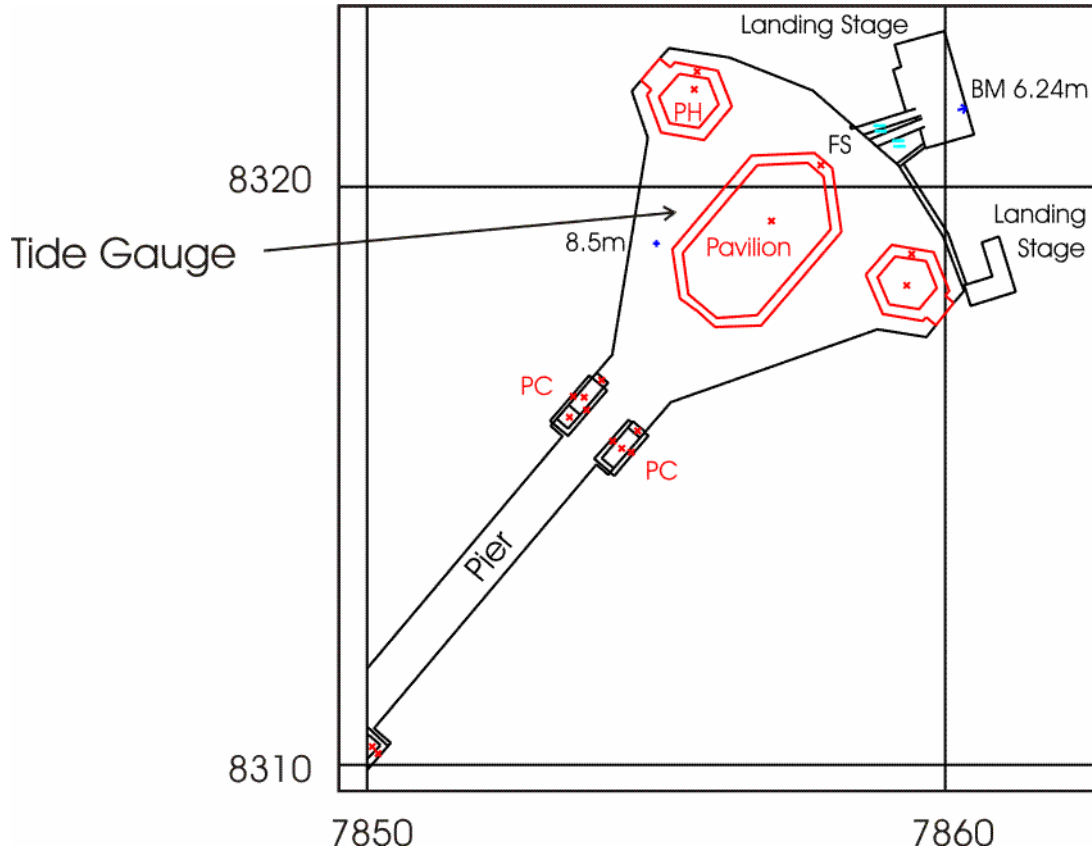
30/06/2015 (Day 181) Maintenance. Survey - work taking place on the pier.

08/09/2015 (Day 252) Compressor change.

Notes on Data Quality

The site met the agreed target of being operational for at least 75% of each calendar month in 2015.

Llandudno – Map & Images of Site



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Llandudno – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	1.419	15	01:45:00	1.428	15	01:45:00	-0.396	2	19:00:00	-0.385	2	19:00:00
Feb	0.667	28	22:30:00	0.678	28	22:30:00	-0.497	6	22:00:00	-0.493	6	22:00:00
Mar	0.876	31	00:15:00	0.878	31	00:15:00	-0.465	10	10:15:00	-0.455	10	10:15:00
Apr	0.686	12	12:00:00	0.692	12	12:00:00	-0.34	4	08:45:00	-0.334	4	08:45:00
May	0.55	5	19:30:00	0.557	5	19:30:00	-0.255	27	00:15:00	-0.25	27	00:15:00
Jun	0.82	1	21:00:00	0.825	1	21:00:00	-0.418	8	17:15:00	-0.415	8	17:15:00
July	0.371	6	23:15:00	0.378	6	23:15:00	-0.166	16	09:00:00	-0.158	16	09:00:00
Aug	0.436	4	06:45:00	0.44	4	06:45:00	-0.129	12	07:45:00	-0.122	12	11:15:00
Sep	0.307	16	08:45:00	0.315	16	08:45:00	-0.316	30	09:15:00	-0.308	30	09:15:00
Oct	0.445	5	12:30:00	0.451	5	12:30:00	-0.334	12	22:30:00	-0.329	12	23:30:00
Nov	0.782	17	20:45:00	0.786	17	20:45:00	-0.566	21	14:45:00	-0.556	21	14:45:00
Dec	1.08	30	08:45:00	1.084	30	08:45:00	-0.381	2	23:30:00	-0.376	2	23:30:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	4.538	23	12:30:00	4.546	23	12:30:00	-4.047	22	18:30:00	-4.04	22	18:30:00
Feb	4.624	20	11:30:00	4.634	20	11:30:00	-4.172	21	19:00:00	-4.156	21	19:00:00
Mar	4.519	22	12:00:00	4.525	22	12:00:00	-4.386	21	17:45:00	-4.382	21	17:45:00
Apr	4.275	19	10:45:00	4.281	19	10:45:00	-4.041	18	16:45:00	-4.036	18	16:45:00
May	4.229	18	10:30:00	4.235	18	10:30:00	-3.643	20	06:15:00	-3.638	20	06:15:00
Jun	4.031	1	22:00:00	4.035	1	22:00:00	-3.373	18	06:00:00	-3.368	18	06:00:00
July	4.056	5	00:15:00	4.062	5	00:15:00	-3.546	5	07:00:00	-3.541	5	07:00:00
Aug	4.601	31	23:45:00	4.607	31	23:45:00	-4.038	31	05:45:00	-4.034	31	05:45:00
Sep	4.583	1	00:00:00	4.588	1	00:00:00	-4.286	30	06:15:00	-4.281	30	06:15:00
Oct	4.745	28	23:15:00	4.751	28	23:15:00	-3.965	1	07:00:00	-3.959	1	07:00:00
Nov	4.31	27	11:15:00	4.315	27	11:15:00	-3.749	26	04:45:00	-3.743	26	04:45:00
Dec	4.278	26	11:00:00	4.284	26	11:00:00	-3.234	27	18:30:00	-3.228	27	18:30:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	29	0.278	29	0.289
February	26	0.119	26	0.129
March	25	0.146	25	0.154
April	30	0.117	30	0.123
May	31	0.212	31	0.217
June	30	0.158	30	0.164
July	31	0.248	31	0.253
August	29	0.278	29	0.283
September	30	0.213	30	0.218
October	31	0.284	31	0.289
November	27	0.414	27	0.419
December	31	0.51	31	0.515
TOTAL & AVG	350	0.248	350	0.254

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Lowestoft – Tide Gauge Information

Latitude 52° 28' 23.2" N **Longitude** 01° 45' 00.4" E **Grid Ref** TM 5478 9274

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge

Location **Tide Gauge Building** East of the Harbour Master's office

Measuring Points On the quay wall, east of the tide gauge building

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	TM 5482 9273	Bolt on quay wall S side of pier
Aux1	TM 5477 9272	Bolt on concrete jetty at SW corner of TG building
Aux2	TM 5478 9274	CM Harbour Masters Office SE angle S face

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 1.50m below Ordnance Datum Newlyn (ODN)

TGZ = 4.483m below TGBM

Levelling No levelling was carried out in 2015

Site visits

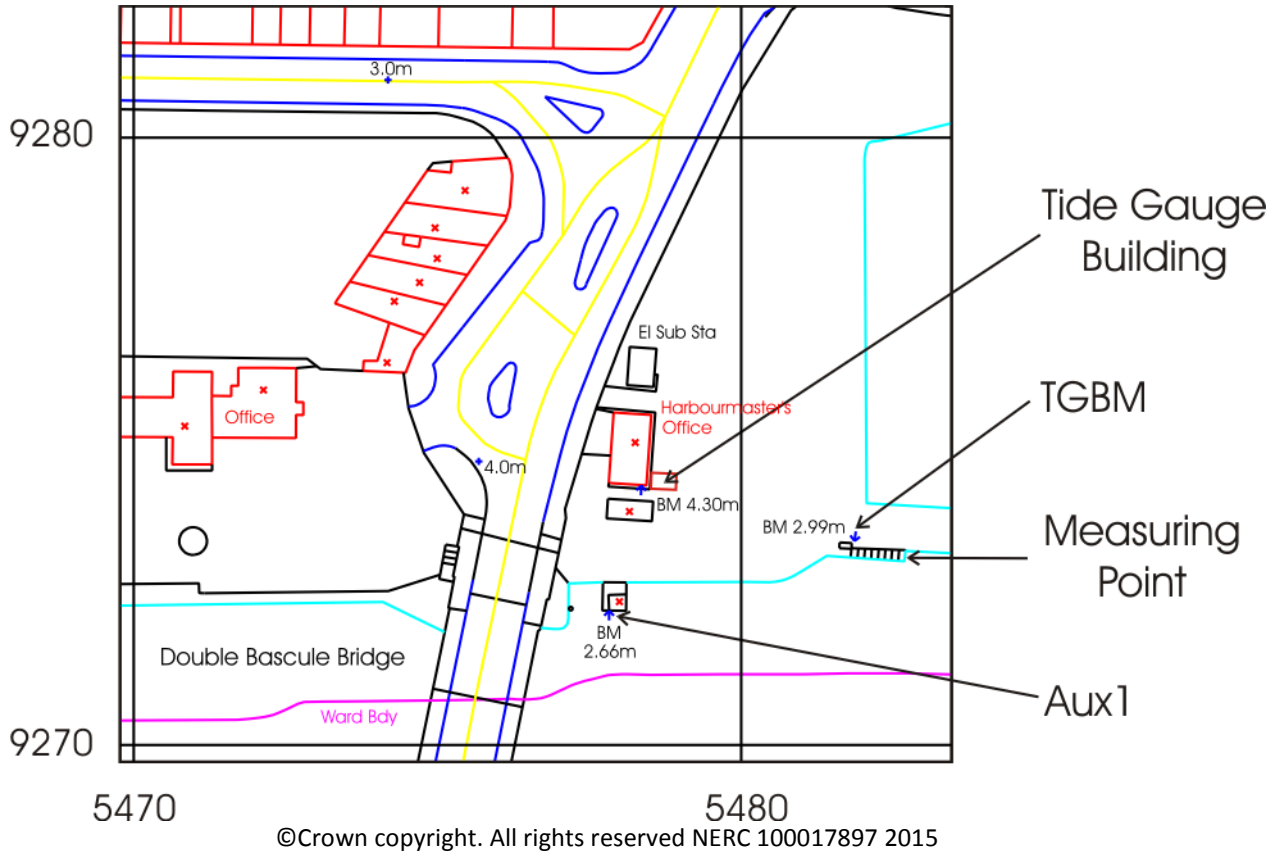
13/05/2014 (Day 133) Diving inspection and maintenance of underwater equipment.

06/08/2015 (Day 218) Maintenance. Compressor change.

Notes on Data Quality

The site met the agreed target of being operational for at least 75% of each calendar month in 2015.

Lowestoft – Map & Images of Site



Lowestoft – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	1.622	10	19:45:00	1.627	10	19:45:00	-1.091	15	06:15:00	-1.078	15	06:15:00
Feb	0.581	26	21:00:00	0.595	26	21:00:00	-0.983	23	00:00:00	-0.975	22	23:45:00
Mar	0.924	10	17:00:00	0.937	10	17:00:00	-0.907	10	00:00:00	-0.884	10	00:00:00
Apr	0.817	1	04:00:00	0.827	1	04:00:00	-0.347	13	22:15:00	-0.34	13	22:15:00
May	0.398	16	15:30:00	0.404	16	15:30:00	-0.364	6	14:45:00	-0.336	6	14:45:00
Jun	0.291	1	07:00:00	0.335	3	07:45:00	-0.732	2	03:45:00	-0.709	2	03:45:00
July	0.625	25	12:15:00	0.644	25	12:15:00	-0.259	17	14:45:00	-0.243	17	14:45:00
Aug	0.203	25	15:15:00	0.219	25	15:15:00	-0.273	21	10:00:00	-0.261	21	10:00:00
Sep	0.539	5	18:00:00	0.551	5	18:00:00	-0.306	28	23:45:00	-0.312	28	23:45:00
Oct	0.925	23	00:15:00	0.94	23	00:15:00	-0.422	23	17:45:00	-0.406	23	17:45:00
Nov	1.245	13	17:15:00	1.255	13	17:15:00	-0.629	8	23:30:00	-0.602	8	23:30:00
Dec	0.662	6	18:00:00	0.676	6	18:00:00	-1.145	30	12:45:00	-1.136	30	12:45:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	2.22	11	00:00:00	2.226	11	00:00:00	-1.36	23	05:30:00	-1.351	23	05:30:00
Feb	1.49	21	23:15:00	1.503	21	23:15:00	-1.343	22	18:15:00	-1.336	22	18:15:00
Mar	1.513	23	23:30:00	1.527	23	23:30:00	-1.548	22	05:00:00	-1.53	22	05:00:00
Apr	1.285	1	07:30:00	1.298	1	07:30:00	-1.291	19	03:45:00	-1.282	19	03:45:00
May	1.246	18	21:30:00	1.256	18	21:30:00	-1.219	16	01:45:00	-1.211	16	01:45:00
Jun	1.264	18	10:15:00	1.278	18	10:15:00	-1.461	2	03:15:00	-1.446	2	03:15:00
July	1.49	8	14:00:00	1.496	8	14:00:00	-1.129	17	16:45:00	-1.112	4	17:15:00
Aug	1.448	31	10:00:00	1.47	31	09:45:00	-1.344	3	17:45:00	-1.326	3	18:00:00
Sep	1.599	2	11:45:00	1.612	2	11:45:00	-1.361	28	15:45:00	-1.351	28	15:45:00
Oct	1.428	27	08:45:00	1.428	27	08:45:00	-1.173	29	16:45:00	-1.168	29	16:45:00
Nov	1.972	13	22:00:00	1.982	13	22:00:00	-1.124	26	15:45:00	-1.118	26	15:45:00
Dec	1.43	23	06:45:00	1.438	23	06:45:00	-1.458	24	14:15:00	-1.443	24	14:15:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.243	31	0.257
February	28	0.091	28	0.106
March	31	0.085	31	0.1
April	30	0.086	30	0.098
May	29	0.132	31	0.145
June	22	0.128	30	0.121
July	31	0.198	31	0.209
August	31	0.195	31	0.208
September	30	0.24	30	0.252
October	31	0.237	29	0.255
November	30	0.344	24	0.376
December	31	0.181	31	0.198
TOTAL & AVG	355	0.180	357	0.194

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Milford Haven – Tide Gauge Information

Latitude 51° 42' 26.6" N **Longitude** 05° 03' 05.5" W **Grid Ref** SM 8925 0537

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge
Location **Tide Gauge Building** Store room at the shore end of Milford Haven Port
Authority jetty
Measuring Points Seaward end of the jetty

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	SM 8921 0536	OSBM Bolt on wall W side of entrance to jetty
Aux1	SM 8918 0541	Fl Br G4977 office buildings. SW face NW angle.
Aux2	SM 9001 0601	OSBM bolt wall Victoria Road

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)
TGZ = 3.71m below Ordnance Datum Newlyn (ODN)
TGZ = 16.734m below TGBM

Levelling No levelling was carried out in 2015

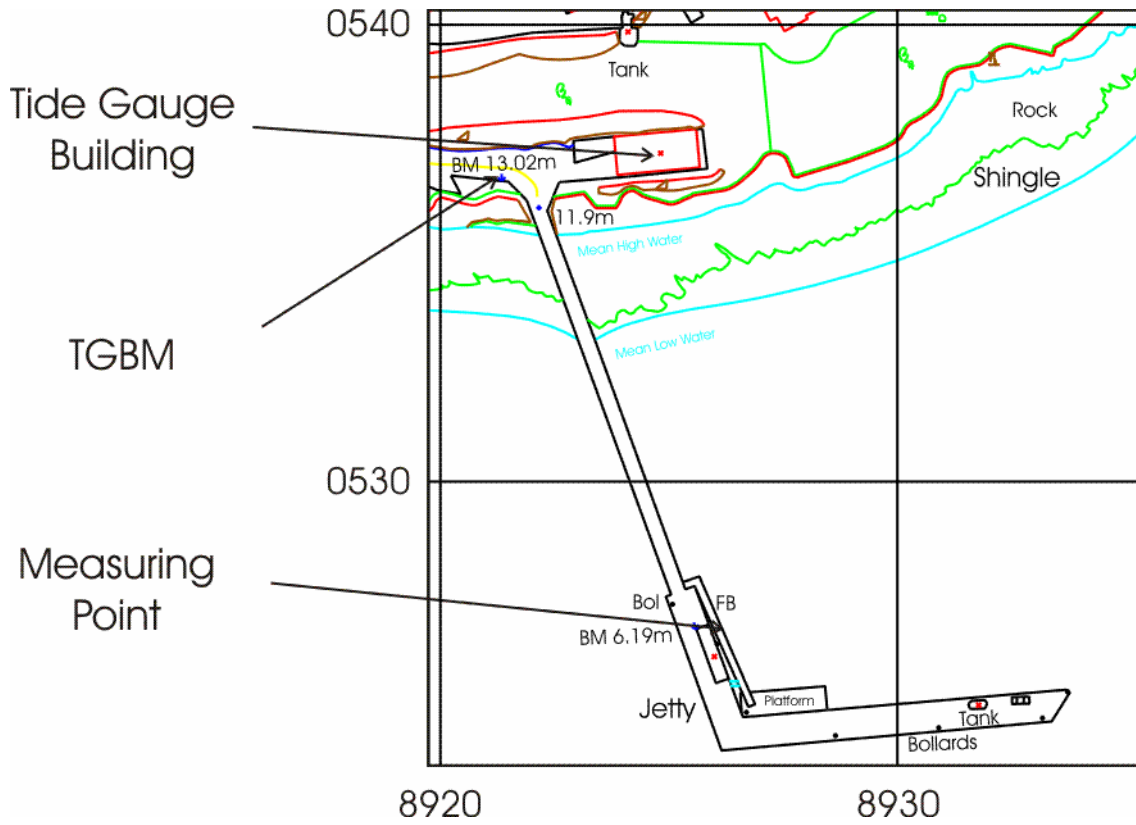
Site visits

07/05/2015 (Day 127) Maintenance.

Notes on Data Quality

Channel 1 has been flagged from July onwards and Channel 2 in September and December. The pneumatic lines are very long at the site, which can block or pinch at bends, due to shrinkage. It is possible that the pneumatic lines have contracted with age.

Milford Haven – Map & Images of Site



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Milford Haven – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	0.966	14	22:30:00	0.466	9	00:30:00	-0.363	30	10:30:00	-0.372	30	10:30:00
Feb	0.456	23	14:15:00	0.399	28	17:45:00	-0.353	6	18:15:00	-0.356	6	18:15:00
Mar	0.413	30	17:45:00	0.402	30	17:45:00	-0.346	13	11:00:00	-0.356	13	11:00:00
Apr	0.256	10	23:30:00	0.253	10	23:30:00	-0.209	7	13:15:00	-0.208	7	13:15:00
May	0.636	5	15:00:00	0.629	5	15:00:00	-0.183	24	16:30:00	-0.179	24	16:30:00
Jun	0.531	1	17:00:00	0.486	1	16:00:00	-0.338	8	21:00:00	-0.334	8	21:00:00
July	0.317	6	19:30:00	0.435	26	07:15:00	-0.064	15	14:15:00	-0.056	8	20:30:00
Aug				0.5	26	06:00:00				-0.051	7	21:15:00
Sep				0.357	17	02:45:00				-0.237	30	03:30:00
Oct				0.539	5	06:30:00				-0.186	12	17:45:00
Nov				0.623	17	11:45:00				-0.606	21	10:30:00
Dec				0.779	30	04:30:00				-0.233	8	18:45:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	3.945	23	08:00:00	3.938	23	08:00:00	-3.405	22	13:30:00	-3.407	22	13:30:00
Feb	4.027	21	07:45:00	3.94	20	19:30:00	-3.629	21	14:15:00	-3.577	20	13:30:00
Mar	4.031	22	07:30:00	4.018	22	07:30:00	-3.816	21	13:00:00	-3.813	21	13:00:00
Apr	3.819	20	07:15:00	3.81	20	07:15:00	-3.47	21	01:45:00	-3.467	21	01:45:00
May	3.657	18	06:00:00	3.655	18	06:00:00	-3.149	20	01:30:00	-3.149	20	01:30:00
Jun	3.361	1	17:30:00	3.286	4	19:15:00	-2.829	18	01:15:00	-2.826	18	01:15:00
July	3.552	4	20:00:00	3.546	4	20:00:00	-2.992	5	02:15:00	-2.99	5	02:15:00
Aug				4.123	31	19:15:00				-3.438	31	01:00:00
Sep				4.071	29	19:00:00				-3.73	30	01:30:00
Oct				4.283	28	18:45:00				-3.431	1	02:00:00
Nov				3.792	27	06:45:00				-3.269	26	00:00:00
Dec				3.45	14	07:45:00				-2.527	12	00:30:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	29	0.207	23	0.141
February	21	0.047	22	0.065
March	31	0.072	31	0.066
April	30	0.108	30	0.107
May	31	0.193	31	0.191
June	30	0.128	28	0.115
July	19	0.212	31	0.23
August	0	*	31	0.271
September	0	*	10	*
October	0	*	31	0.293
November	0	*	30	0.329
December	0	*	18	0.385
TOTAL & AVG	191	**	316	0.198

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Millport – Tide Gauge Information

Latitude 55° 44' 59.3" N **Longitude** 04° 54' 22.8" W **Grid Ref** NS 1769 5454

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge
Location **Tide Gauge Building** Store room at the shore end of the University Marine Biological Station pier
Measuring Points Seaward end of the pier

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	NS 1757 5449	Fl Br G4602 Marine station
Aux1	NS 1772 5457	OSBM bolt rock SE side Rd 5M NE end wall
Aux2	NS 1769 5454	Rivet pier 0.8M prod SE face of TG building
Aux3	NS 1718 5451	No 45 Marine Parade NW angle N face

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 1.62m below Ordnance Datum Newlyn (ODN)

TGZ = 7.825m below TGBM

Levelling No levelling was carried out in 2015

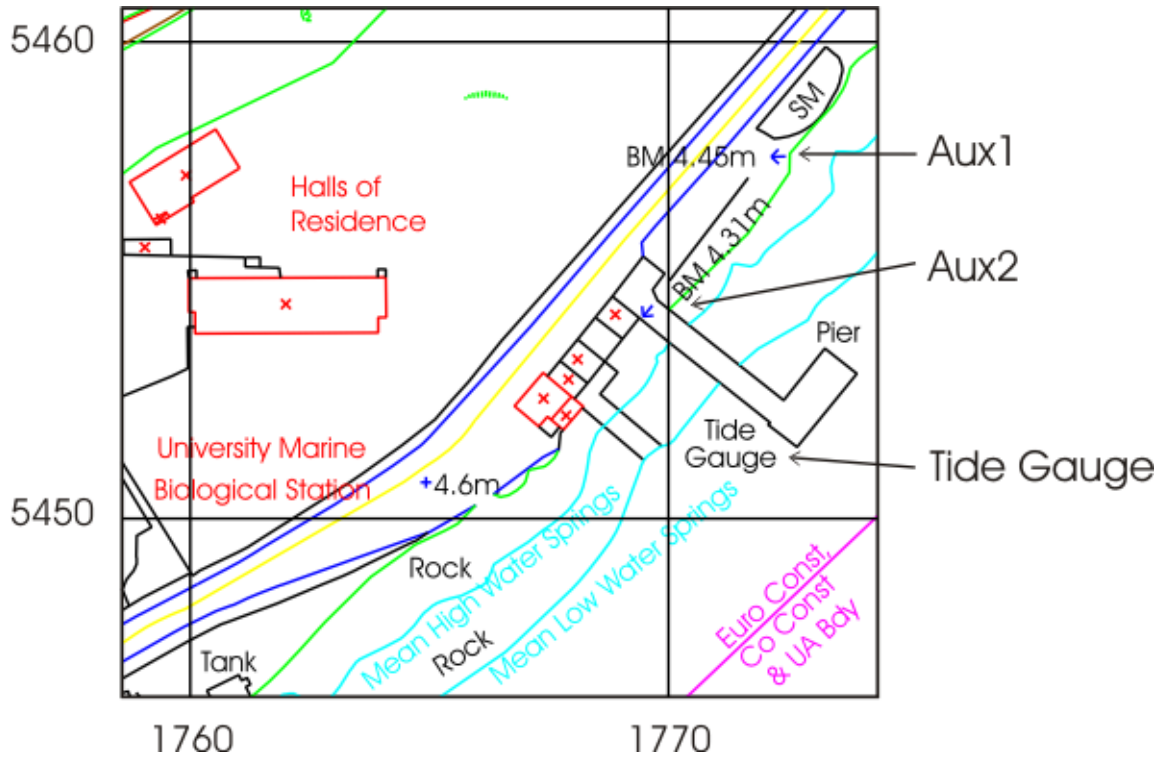
Site visits

No site visits were carried out in 2015

Notes on Data Quality

The site exceeded the agreed target of being operational for at least 75% of each calendar month in 2015.

Millport – Map & Images of Site



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Millport – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	1.758	15	05:30:00	1.743	15	05:30:00	-0.614	31	21:45:00	-0.627	31	21:45:00
Feb	1.082	28	22:45:00	1.069	28	22:45:00	-0.555	7	00:45:00	-0.568	7	00:45:00
Mar	0.923	1	00:00:00	0.909	1	00:00:00	-0.427	14	02:15:00	-0.426	14	02:15:00
Apr	0.409	12	14:45:00	0.398	12	14:45:00	-0.354	3	21:45:00	-0.364	3	21:45:00
May	0.611	5	22:45:00	0.603	5	23:00:00	-0.236	25	23:15:00	-0.247	25	23:15:00
Jun	1.084	1	19:00:00	1.073	1	19:00:00	-0.431	8	15:15:00	-0.438	8	15:15:00
July	0.519	7	00:30:00	0.511	7	00:30:00	-0.201	8	16:45:00	-0.197	8	17:00:00
Aug	0.572	4	05:15:00	0.565	4	05:15:00	-0.124	12	22:15:00	-0.123	12	22:30:00
Sep	0.317	12	17:15:00	0.315	16	11:45:00	-0.323	30	13:00:00	-0.324	30	13:00:00
Oct	0.596	29	08:15:00	0.59	29	08:15:00	-0.37	12	21:30:00	-0.371	12	22:00:00
Nov	0.857	12	19:45:00	0.852	12	19:45:00	-0.695	21	08:45:00	-0.687	21	08:45:00
Dec	1.259	30	08:00:00	1.254	30	08:00:00	-0.34	6	17:15:00	-0.341	6	17:15:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	2.819	15	06:00:00	2.805	15	06:00:00	-1.62	24	20:45:00	-1.635	24	20:45:00
Feb	2.707	22	14:45:00	2.693	22	14:45:00	-1.613	21	19:30:00	-1.625	21	19:30:00
Mar	2.476	9	14:15:00	2.467	9	14:15:00	-1.883	21	18:30:00	-1.889	21	18:30:00
Apr	1.885	25	04:15:00	1.881	25	04:15:00	-1.703	18	17:15:00	-1.71	18	17:15:00
May	2.111	6	01:15:00	2.102	6	01:15:00	-1.521	20	06:45:00	-1.529	20	06:45:00
Jun	2.497	2	00:00:00	2.487	2	00:00:00	-1.524	8	09:45:00	-1.532	8	09:45:00
July	2.148	7	03:30:00	2.141	7	03:30:00	-1.425	5	07:45:00	-1.43	5	07:45:00
Aug	2.486	4	02:45:00	2.475	4	02:45:00	-1.618	31	06:30:00	-1.611	31	06:15:00
Sep	2.015	2	02:15:00	2.021	2	02:15:00	-1.777	30	06:45:00	-1.779	30	06:45:00
Oct	2.332	29	01:00:00	2.332	29	01:00:00	-1.579	1	07:30:00	-1.581	1	07:30:00
Nov	2.39	16	02:30:00	2.385	16	02:30:00	-1.542	26	05:15:00	-1.542	26	05:15:00
Dec	2.945	30	14:45:00	2.941	30	14:45:00	-1.142	14	19:45:00	-1.138	14	19:45:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.515	31	0.501
February	28	0.31	28	0.296
March	31	0.328	31	0.321
April	30	0.276	30	0.267
May	31	0.384	31	0.375
June	30	0.325	30	0.318
July	31	0.411	31	0.412
August	31	0.46	31	0.457
September	30	0.359	30	0.359
October	31	0.45	31	0.446
November	30	0.589	30	0.587
December	31	0.781	31	0.778
TOTAL & AVG	365	0.432	365	0.426

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Mumbles – Tide Gauge Information

Latitude 51° 34' 12.0" N **Longitude** 03° 58' 31.6" W **Grid Ref** SS 6319 8753

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge

Location **Tide Gauge Building** Mumbles lifeboat station

Measuring Points Near the end of the lifeboat slipway

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	SS 6298 8743	OSBM bolt living rock S side of road
Aux1	SS 6317 8752	OSBM bolt lifeboat station Mumbles Pier
Aux2	SS 6284 8750	OSBM bolt concrete base bollard Lifeboat Cottages
Aux3	SS 6258 8760	Rivet SE side concrete chamber

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 5.00m below Ordnance Datum Newlyn (ODN)

TGZ = 13.821m below TGBM

Levelling No levelling was carried out in 2015

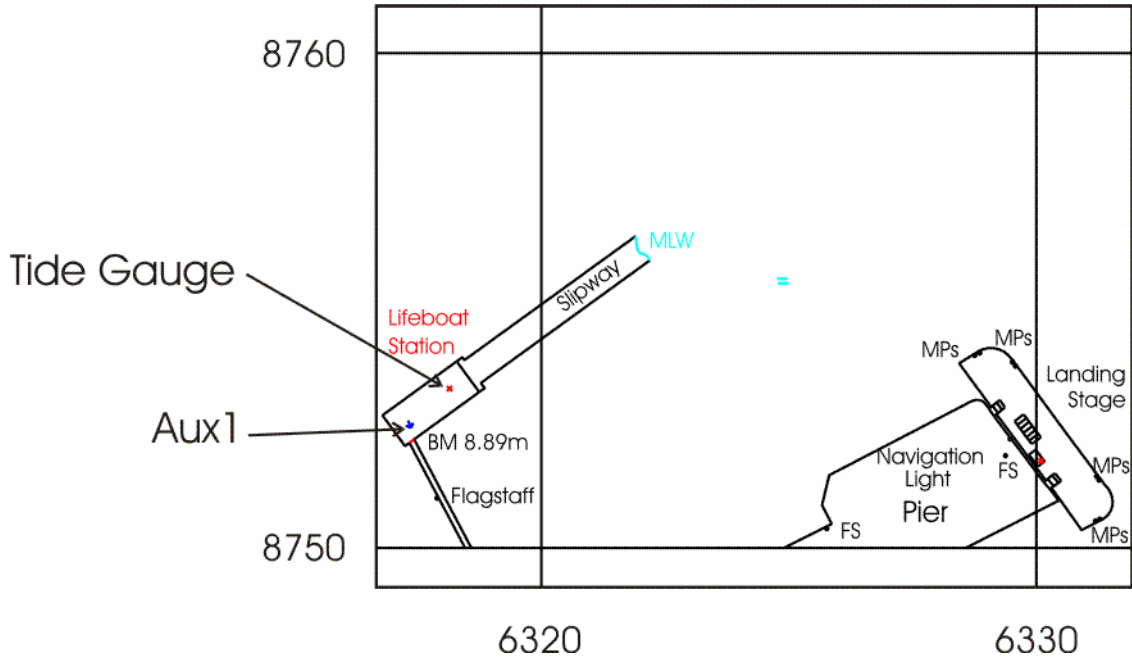
Site visits

No site visits were carried out in 2015

Notes on Data Quality

The previous installation at Mumbles stopped transmitting data in June 2014, as the power supply was turned off to the old Lifeboat station. The gauge was relocated by an external contractor and began transmitting data on 15 September 2015. The data from the new installation have not been extensively quality controlled by BODC as there is no calibration or levelling information. It would appear that there is a cyclical influence between the two full tide channels, with differences varying between spring high waters, spring low waters, neap high waters and neap low waters. The level of the mid-tide is different in the new installation.

Mumbles – Map & Images of Site



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Mumbles – Statistics

Data quality throughout 2015 was not good enough to produce any statistics.

Newhaven – Tide Gauge Information

Latitude 50° 46' 54.4" N **Longitude** 00° 03' 25.3" E **Grid Ref** TQ 4511 0004

Instrument Data acquisition system with two full-tide bubbler gauges

Location **Tide Gauge Building** Within the Port Control building on West Pier

Measuring Points On the pier wall, south east of the Port Control building

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	TQ 4510 0003	Bolt concrete 7.4M SW of SW angle of tower
Aux1	TQ 4495 0001	OSBM bolt concrete sea wall 154.3M SW of tower
Aux2	TQ 4503 0008	Steel ball Gun mount

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 3.52m below Ordnance Datum Newlyn (ODN)

TGZ = 8.783m below TGBM

Levelling No levelling was carried out in 2015

Site visits

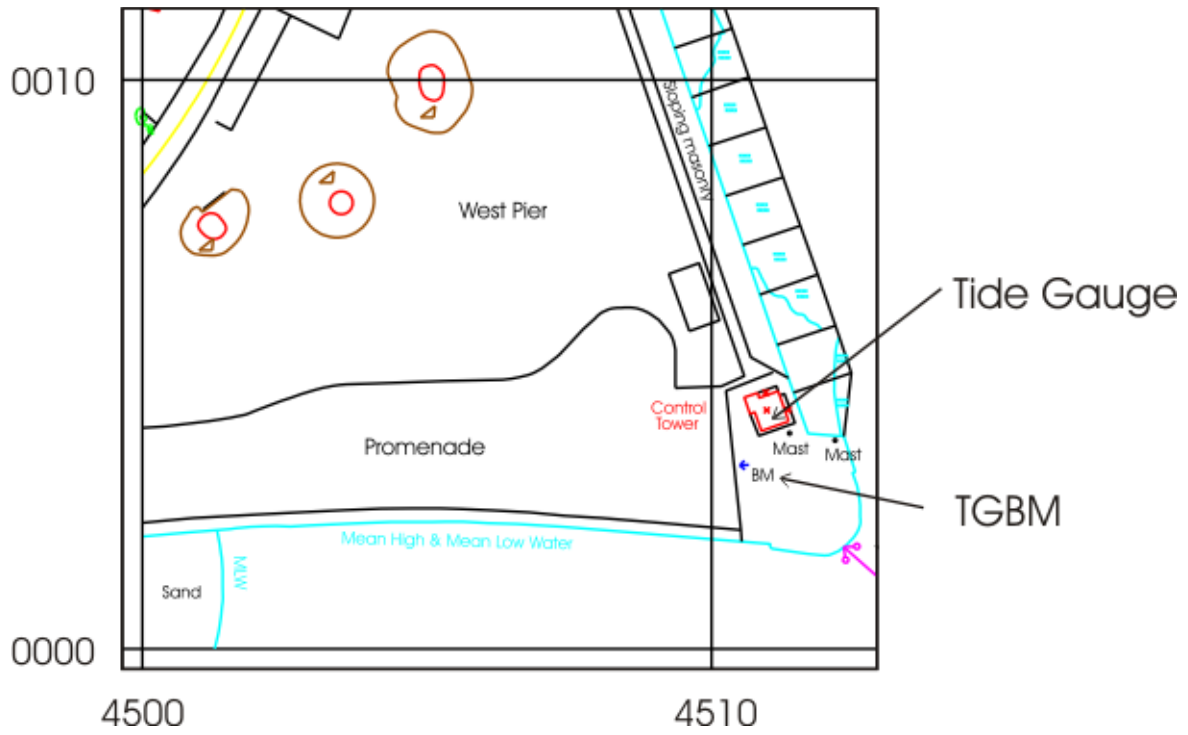
24/02/2015 (Day 055) Maintenance. Compressor change.

30/09/2015 (Day 273) Maintenance.

Notes on Data Quality

The site exceeded the agreed target of being operational for at least 75% of each calendar month in 2015.

Newhaven – Map & Images of Site



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Newhaven – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	0.804	13	02:45:00	0.809	13	02:45:00	-0.392	10	13:30:00	-0.385	10	13:45:00
Feb	0.624	23	17:45:00	0.633	23	17:45:00	-0.687	6	23:00:00	-0.674	6	22:45:00
Mar	0.672	29	11:30:00	0.679	29	11:30:00	-0.49	5	09:00:00	-0.48	5	09:15:00
Apr	0.26	26	02:45:00	0.271	26	03:00:00	-0.409	22	11:30:00	-0.397	22	11:30:00
May	0.628	5	10:30:00	0.638	5	10:30:00	-0.255	21	11:15:00	-0.242	21	11:15:00
Jun	0.227	22	18:45:00	0.235	22	18:45:00	-0.468	9	13:45:00	-0.454	9	13:45:00
July	0.402	25	16:45:00	0.415	25	16:45:00	-0.251	2	10:00:00	-0.243	2	10:00:00
Aug	0.384	25	16:45:00	0.395	25	16:45:00	-0.209	28	21:45:00	-0.195	28	21:45:00
Sep	0.462	14	14:45:00	0.473	14	14:45:00	-0.467	29	22:00:00	-0.462	29	22:00:00
Oct	0.374	23	00:00:00	0.386	23	00:00:00	-0.37	1	23:30:00	-0.352	1	23:30:00
Nov	0.585	19	16:30:00	0.596	19	16:30:00	-0.327	22	04:45:00	-0.321	22	04:45:00
Dec	0.644	31	06:45:00	0.658	31	06:45:00	-0.384	10	09:30:00	-0.373	10	09:30:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	3.571	24	13:45:00	3.58	24	14:00:00	-3.223	22	18:45:00	-3.214	22	18:45:00
Feb	3.823	21	00:30:00	3.83	21	00:30:00	-3.257	19	17:45:00	-3.231	19	17:45:00
Mar	3.695	21	11:45:00	3.71	21	11:45:00	-3.456	22	19:00:00	-3.446	22	19:00:00
Apr	3.491	19	23:45:00	3.505	19	23:45:00	-3.253	18	17:00:00	-3.242	18	17:00:00
May	3.508	18	23:15:00	3.518	18	23:15:00	-2.905	18	05:15:00	-2.894	18	05:15:00
Jun	3.15	18	12:15:00	3.164	18	12:15:00	-2.85	17	05:45:00	-2.841	17	05:45:00
July	3.247	5	13:30:00	3.256	4	00:00:00	-2.907	5	07:30:00	-2.9	5	07:30:00
Aug	3.73	31	12:00:00	3.737	31	12:00:00	-3.12	31	06:15:00	-3.11	31	06:15:00
Sep	3.737	1	12:45:00	3.752	1	13:00:00	-3.383	29	05:45:00	-3.373	29	05:45:00
Oct	3.82	28	11:15:00	3.829	28	11:15:00	-3.151	1	07:15:00	-3.141	1	07:15:00
Nov	3.56	28	12:30:00	3.573	28	12:30:00	-3.027	26	17:30:00	-3.018	26	17:30:00
Dec	3.485	25	10:45:00	3.495	25	10:45:00	-2.737	27	18:45:00	-2.731	27	18:45:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.189	31	0.199
February	28	0.051	28	0.061
March	31	0.028	31	0.038
April	30	0.031	30	0.041
May	31	0.118	31	0.127
June	30	0.061	30	0.071
July	31	0.157	31	0.167
August	31	0.176	31	0.185
September	30	0.181	30	0.191
October	31	0.198	31	0.208
November	30	0.278	30	0.289
December	29	0.24	31	0.252
TOTAL & AVG	363	0.142	365	0.152

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Newlyn – Tide Gauge Information

Latitude 50° 06' 10.8" N **Longitude** 05° 32' 34.2" W **Grid Ref** SW 4676 2856

Instrument Data acquisition system with a full-tide and mid-tide bubbler gauge and a back-up potentiometer attached to a Munro float gauge

Location **Tide Gauge Building** Tidal Observatory at the end of South Pier, next to the lighthouse

Measuring Points Seaward side of the pier, behind the lighthouse

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	SW 4677 2856	Brass bolt in the floor of the recorder hut.
Aux1	SW 4673 2851	Flush Bracket 1565 on wall S pier NW face 17.8m SW
Aux2	SW 4659 2841	F Bracket 1520 wall SE side of S Pier Rd NW face

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 3.05m below Ordnance Datum Newlyn (ODN)

TGZ = 7.801m below TGBM

Levelling Site was levelled on 11/09/2015

Site visits

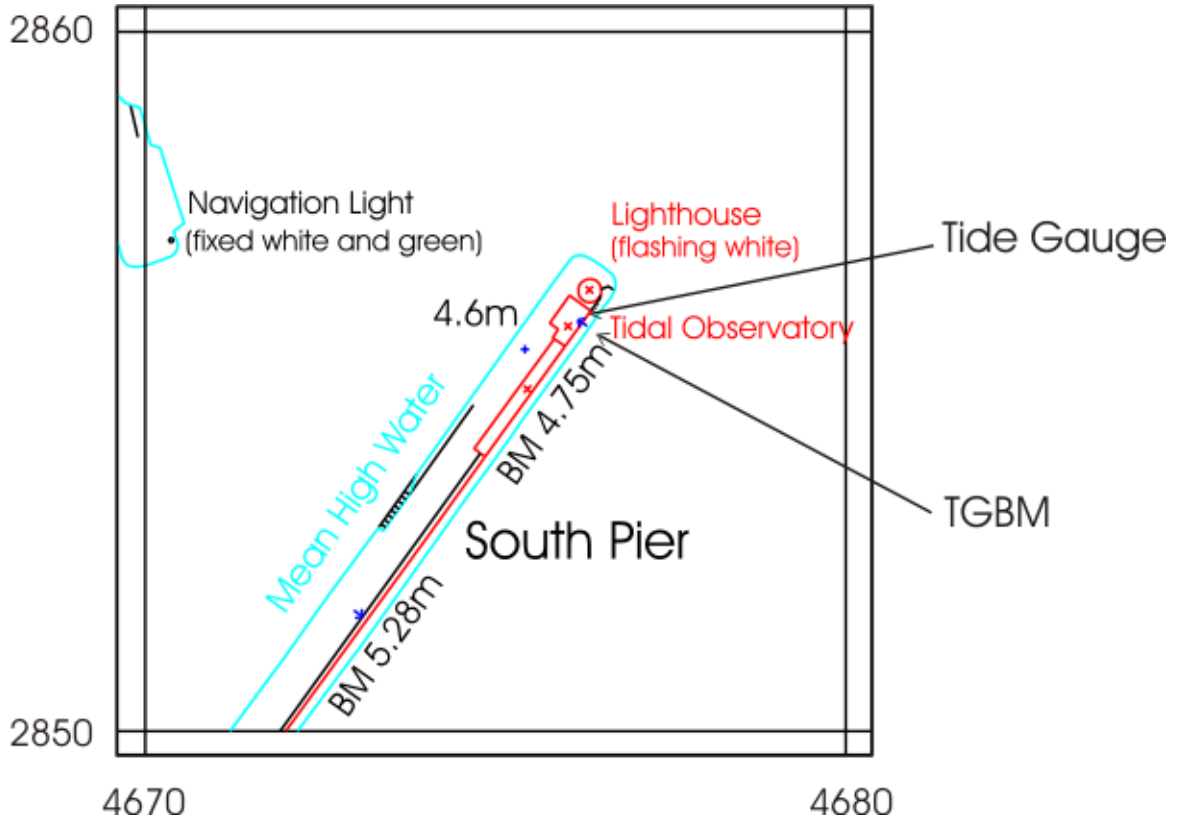
26/03/2015 (Day 085) Compressor change. Collect equipment to refurbish float gauge. Full tide bubbler blocked. DQ reconnected to spare full tide bubbler channel.

11/09/2015 (Day 254) Float gauge refurbishment. Maintenance. Levelling.

Notes on Data Quality

Channel 2 was blocking in February and the line was purged and the blockage was cleared. Channel 1 has been flagged throughout. On 30 September 2014 there was a report of a power failure at Newlyn and the float gauge then began recording a constant height of 5.5m. A fault on the main pier power cable caused earthing points to become live via standing water, the surge tracked down the float wire causing it to rupture at a weak point on the float. The gauge spun out of control causing damage to the mechanism. In March the float was recovered from the stilling well and on 11 September the float gauge was refurbished.

Newlyn – Map & Images of Site



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Newlyn – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan				0.563	15	00:00:00				-0.32	2	11:15:00
Feb				0.206	3	02:00:00				-0.246	5	14:45:00
Mar				0.176	1	04:45:00				-0.347	5	14:30:00
Apr				0.189	16	10:00:00				-0.233	7	15:45:00
May				0.413	5	01:15:00				-0.219	21	16:30:00
Jun				0.21	1	23:15:00				-0.311	8	18:15:00
July				0.267	26	10:15:00				-0.133	31	03:30:00
Aug				0.313	26	01:45:00				-0.12	1	16:45:00
Sep	0.462	16	09:30:00	0.411	16	13:45:00	-0.261	30	03:15:00	-0.235	30	03:15:00
Oct	0.514	4	23:15:00	0.502	4	23:00:00	-0.18	2	04:30:00	-0.185	20	07:00:00
Nov	0.203	27	10:00:00	0.288	17	10:30:00	-0.421	26	02:15:00	-0.345	21	12:45:00
Dec				0.554	30	08:15:00				-0.252	4	10:45:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan				2.914	22	05:45:00				-2.662	24	14:00:00
Feb				2.397	3	04:30:00				-2.247	5	12:15:00
Mar				2.878	21	05:00:00				-2.863	21	11:45:00
Apr				2.801	19	04:45:00				-2.681	21	00:30:00
May				2.639	5	17:30:00				-2.469	20	00:15:00
Jun				2.439	4	17:45:00				-2.292	16	23:15:00
July				2.586	4	18:00:00				-2.359	31	23:15:00
Aug				3.002	31	17:45:00				-2.673	30	23:45:00
Sep	2.942	28	16:45:00	2.955	29	17:30:00	-2.815	30	00:15:00	-2.828	30	00:15:00
Oct	2.688	1	06:30:00	3.209	28	17:00:00	-2.615	1	01:00:00	-2.621	1	01:00:00
Nov	2.79	27	05:15:00	2.78	27	05:15:00	-2.532	25	22:45:00	-2.543	25	22:45:00
Dec				2.821	28	06:30:00				-2.12	27	12:30:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	0	*	31	0.144
February	0	*	4	*
March	0	*	23	0.021
April	0	*	30	0.089
May	0	*	31	0.134
June	0	*	12	*
July	0	*	3	*
August	0	*	11	*
September	16	0.26	6	*
October	8	*	31	0.274
November	5	*	30	0.236
December	0	*	31	0.318
TOTAL & AVG	29	**	243	**

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Newport – Tide Gauge Information

Latitude 51° 33' 00.0" N **Longitude** 02° 59' 14.8" W **Grid Ref** ST 3163 8392

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge
Location **Tide Gauge Building** West side of the entrance to Newport Docks
Measuring Points Attached to the dock wall on the west side of the dock entrance, close to the lock gates

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	ST 3163 8392	Brass bolt adjacent to TG building
Aux1	ST 3160 8414	Pin in quay west side of South Lock
Aux2	ST 3160 8426	Pin in quay east side of South Lock
Aux3	ST 3147 8427	Pin in quay south west corner of South Dock

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)
TGZ = 5.81m below Ordnance Datum Newlyn (ODN)
TGZ = 14.525m below TGBM

Levelling No levelling was carried out in 2015

Site visits

12/06/2015 (Day 163) Maintenance. Compressor change.

Notes on Data Quality

Channel 2 has been flagged from January to November. The pressure point has been blocking as the site suffers from lots of sediment buildup.

Newport – Map & Images of Site



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Newport – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	1.405	15	02:00:00				-0.938	30	10:30:00			
Feb	1.182	20	14:45:00				-0.927	6	03:30:00			
Mar	1.235	29	09:00:00				-0.8	21	15:45:00			
Apr	0.859	20	14:30:00				-0.86	21	16:15:00			
May	1.173	5	15:30:00				-0.451	22	16:30:00			
Jun	1.077	2	02:00:00				-0.611	8	05:30:00			
July	0.873	26	22:00:00				-0.392	16	01:45:00			
Aug	0.799	4	03:45:00				-0.597	31	03:30:00			
Sep	1.082	14	15:15:00				-1.21	30	04:00:00			
Oct	0.691	29	02:15:00				-1.022	1	04:30:00			
Nov	1.469	14	15:45:00				-0.88	21	11:00:00			
Dec	1.099	25	14:30:00	1.165	12	15:15:00	-0.263	10	15:15:00	-0.22	8	19:15:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	7.209	23	09:00:00				-5.471	24	17:15:00			
Feb	7.203	22	21:30:00				-5.638	22	04:45:00			
Mar	7.268	21	19:45:00				-5.782	21	15:30:00			
Apr	7.134	20	08:00:00				-5.75	21	04:00:00			
May	6.978	18	19:15:00				-5.449	20	03:15:00			
Jun	6.219	4	20:15:00				-5.362	4	02:45:00			
July	6.658	4	20:45:00				-5.399	5	04:00:00			
Aug	6.915	3	09:00:00				-5.587	31	03:15:00			
Sep	7.006	28	18:45:00				-5.742	30	04:00:00			
Oct	7.18	29	20:00:00				-5.715	1	04:30:00			
Nov	7.054	27	07:45:00				-5.443	27	02:45:00			
Dec	6.846	26	07:30:00	6.477	24	05:45:00	-4.945	13	02:45:00	-4.954	12	02:00:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.452	0	*
February	27	0.302	0	*
March	31	0.302	0	*
April	30	0.305	0	*
May	31	0.408	0	*
June	30	0.326	0	*
July	31	0.438	0	*
August	30	0.455	0	*
September	30	0.428	0	*
October	31	0.457	0	*
November	20	0.544	0	*
December	10	*	20	0.713
TOTAL & AVG	332	0.426	20	**

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

North Shields – Tide Gauge Information

Latitude 55° 00' 26.8" N **Longitude** 01° 26' 23.2" W **Grid Ref** NZ 3592 6823

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge

Location **Tide Gauge Building** North side of the River Tyne, close to the Port of Tyne Authority offices

Measuring Points As above

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	NZ 3592 6823	Bolt adjacent to tide gauge building
Aux1	NZ 3626 6842	PA Bolt low lighthouse W face SW angle
Aux2	NZ 3630 6895	PA Bolt butt N side railway

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 2.60m below Ordnance Datum Newlyn (ODN)

TGZ = 6.754m below TGBM

Levelling No levelling was carried out in 2015

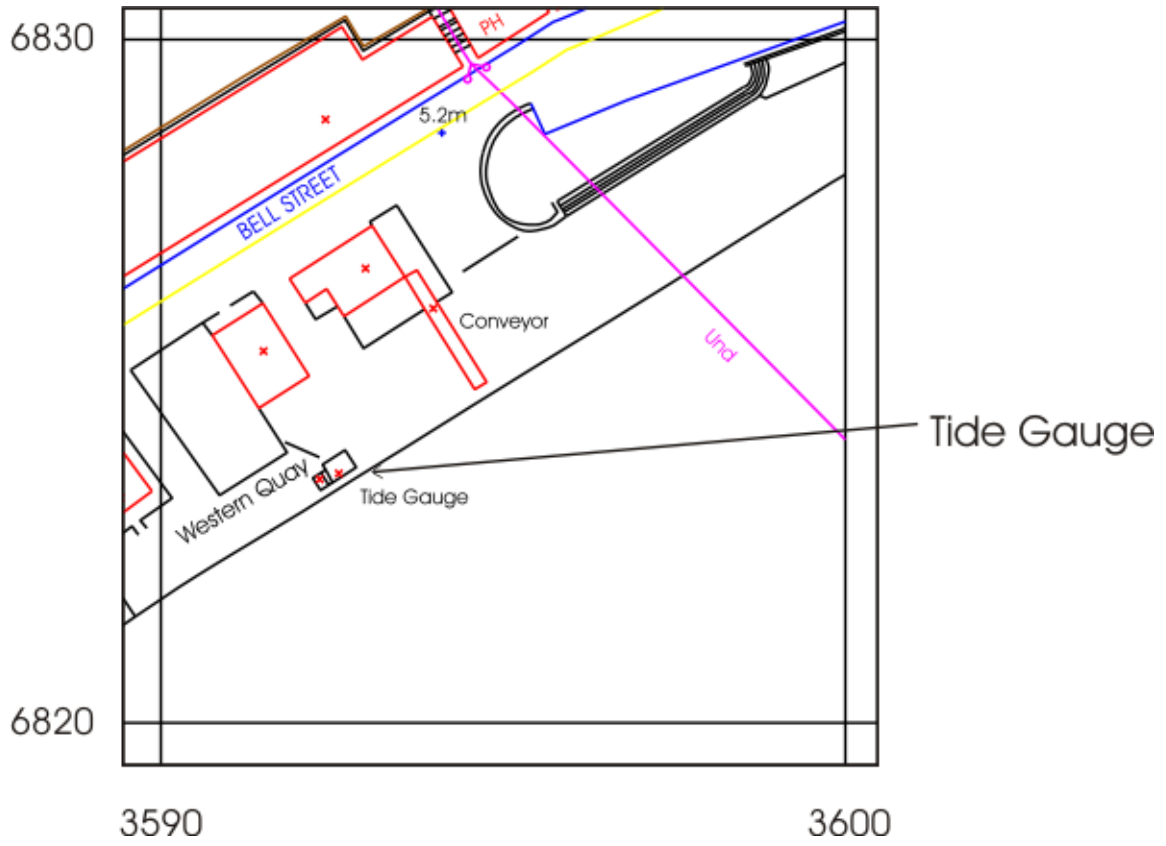
Site visits

29/04/2015 (Day 119) Maintenance. Compressor change. Cleared blocking channel 2.

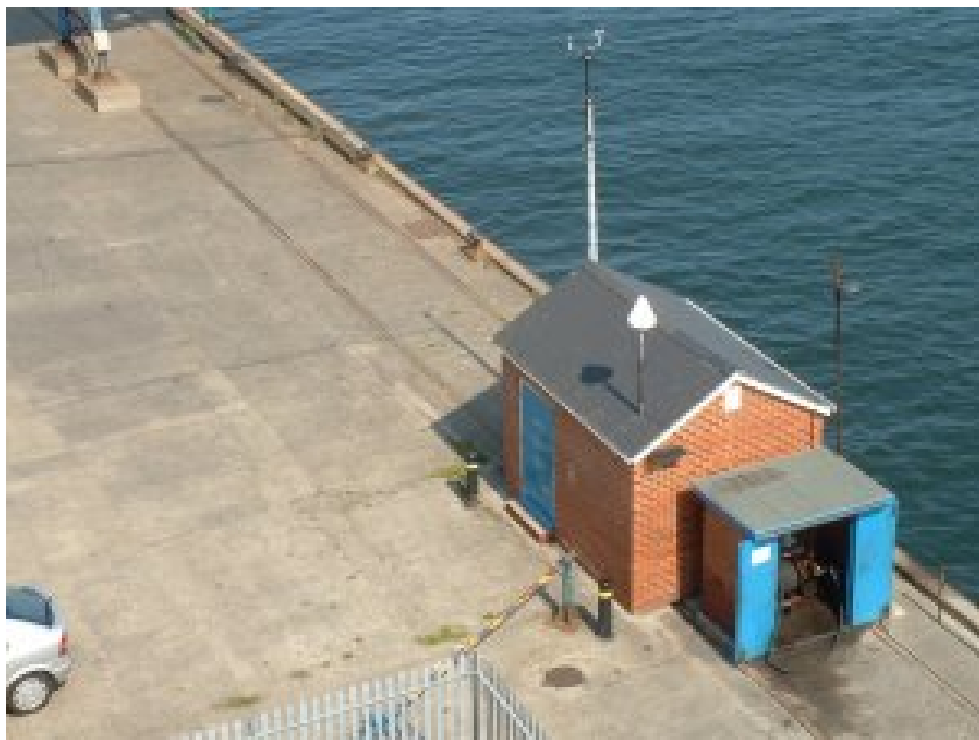
Notes on Data Quality

Channel 2 suffers from blocking at this site. It was cleared during a site visit in April, but began blocking again in October and the data were flagged.

North Shields – Map & Images of Site



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North Shields – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	0.938	10	17:30:00	0.94	10	17:30:00	-0.602	15	06:15:00	-0.599	15	06:15:00
Feb	0.366	28	14:30:00	0.37	28	15:15:00	-0.481	15	18:30:00	-0.478	15	18:30:00
Mar	0.892	10	10:00:00	0.896	10	10:00:00	-0.798	9	21:15:00	-0.795	9	21:15:00
Apr	0.452	1	00:00:00	0.454	1	00:00:00	-0.282	8	14:00:00	-0.279	8	14:00:00
May	0.401	5	02:15:00	0.404	5	02:15:00	-0.195	23	16:45:00	-0.191	23	16:45:00
Jun	0.369	2	23:30:00	0.372	2	23:30:00	-0.265	8	23:45:00	-0.265	8	23:45:00
July	0.342	8	13:00:00	0.342	8	13:00:00	-0.176	17	15:45:00	-0.174	17	15:45:00
Aug	0.253	26	21:00:00	0.254	26	21:00:00	-0.124	19	20:15:00	-0.124	19	20:15:00
Sep	0.342	17	00:30:00	0.344	17	00:30:00	-0.249	28	11:15:00	-0.246	28	11:15:00
Oct	0.849	22	18:45:00	0.361	31	23:45:00	-0.273	23	09:30:00	-0.192	30	16:15:00
Nov	1.076	13	12:30:00	1.077	13	12:30:00	-0.396	8	20:30:00	-0.395	8	20:30:00
Dec	0.665	22	22:00:00	0.668	22	22:00:00	-0.662	30	06:00:00	-0.659	30	06:00:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	3.045	9	18:00:00	3.049	9	18:00:00	-2.51	22	23:15:00	-2.508	22	23:15:00
Feb	3.153	21	17:00:00	3.156	21	17:00:00	-2.381	20	23:00:00	-2.378	20	23:00:00
Mar	3.122	23	17:15:00	3.126	23	17:15:00	-2.746	21	22:30:00	-2.744	21	22:30:00
Apr	2.768	19	15:45:00	2.77	19	15:45:00	-2.473	18	21:30:00	-2.471	18	21:30:00
May	2.807	18	15:15:00	2.81	18	15:15:00	-2.04	17	21:00:00	-2.038	17	21:00:00
Jun	2.55	3	03:15:00	2.552	3	03:15:00	-1.946	6	12:00:00	-1.943	6	12:00:00
July	2.639	5	05:15:00	2.641	5	05:15:00	-2.095	4	11:00:00	-2.093	4	11:00:00
Aug	3.051	31	04:00:00	3.052	31	04:00:00	-2.442	31	10:30:00	-2.441	31	10:30:00
Sep	3.106	2	05:15:00	3.108	2	05:15:00	-2.616	29	10:15:00	-2.614	29	10:15:00
Oct	3.087	28	03:15:00	3.066	30	04:45:00	-2.263	28	09:45:00	-2.247	29	10:30:00
Nov	3.086	27	16:15:00	3.088	27	16:15:00	-2.091	26	09:45:00	-2.09	26	09:45:00
Dec	3.065	25	15:00:00	3.066	25	15:00:00	-2.064	28	23:45:00	-2.063	28	23:45:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.447	31	0.451
February	28	0.289	28	0.293
March	31	0.275	31	0.278
April	29	0.271	25	0.259
May	31	0.344	28	0.349
June	30	0.293	30	0.296
July	31	0.375	31	0.376
August	31	0.393	31	0.394
September	30	0.396	30	0.398
October	31	0.429	9	*
November	30	0.557	30	0.558
December	31	0.516	31	0.517
TOTAL & AVG	364	0.382	335	0.383

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Plymouth Devonport – Tide Gauge Information

Latitude 50° 22' 06.2" N **Longitude** 04° 11' 06.9" W **Grid Ref** SX 4469 5434

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge

Location **Tide Gauge Building** No. 1 Jetty in Devonport Royal Naval base

Measuring Points Attached to the stilling well beneath the building

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	SX 4468 5434	Bolt on jetty wall. 6.6m NW angle T G building
Aux1	SX 4471 5433	Building N face NE angle
Aux2	SX 4487 5425	Bldg NW face W angle
Aux3	SX 4501 5454	Fl Br 11818 bldg W face NW angle

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 3.22m below ODN

TGZ = 7.631m below TGBM

Levelling No levelling was carried out in 2015

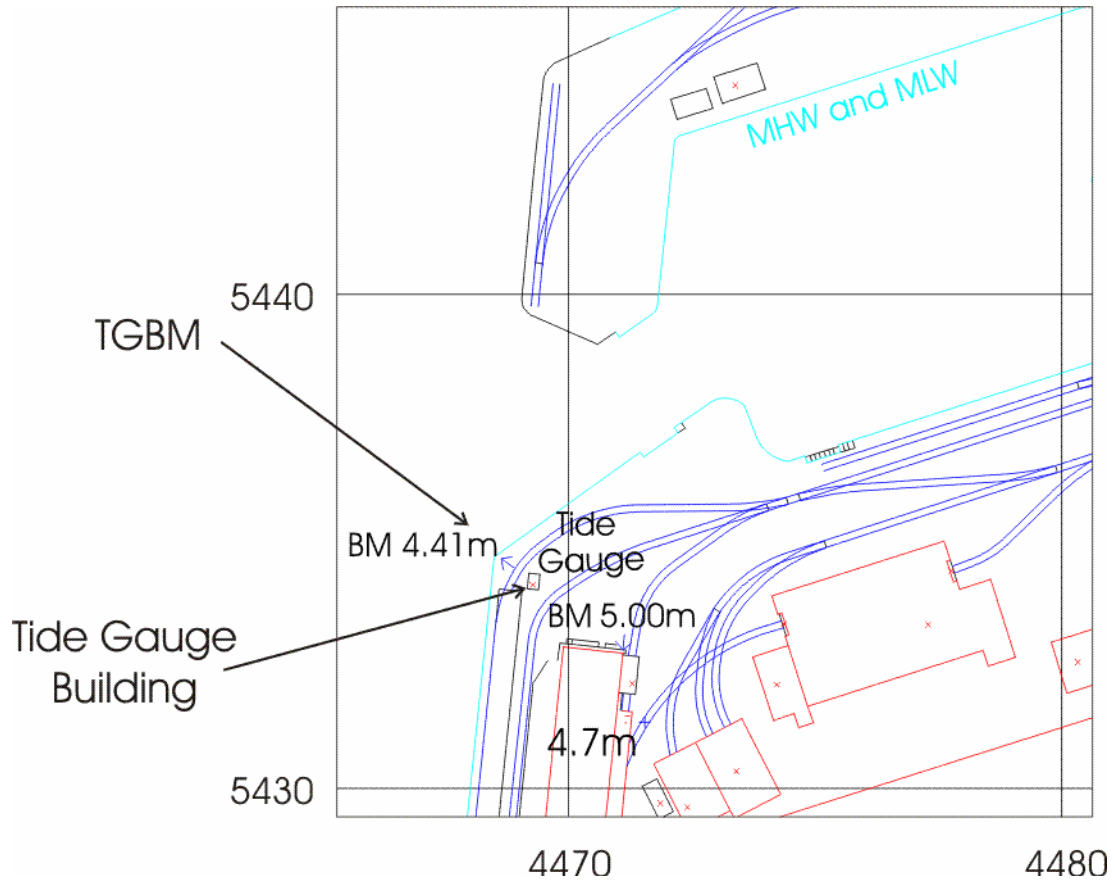
Site visits

27/02/2015 (Day 058) Maintenance.

Notes on Data Quality

Both full tide channels were flagged in December due to the pressure points blocking. However, the site exceeded the agreed target of being operational for at least 75% of each calendar month in 2015.

Plymouth Devonport – Map & Images of Site



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Plymouth Devonport – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	0.7	15	00:15:00	0.696	15	00:15:00	-0.363	24	07:45:00	-0.373	24	07:45:00
Feb	0.357	23	12:45:00	0.348	23	12:45:00	-0.399	7	03:00:00	-0.401	7	03:00:00
Mar	0.218	1	02:45:00	0.219	1	02:45:00	-0.414	5	13:30:00	-0.411	5	13:30:00
Apr	0.179	25	10:30:00	0.181	25	10:30:00	-0.283	7	15:00:00	-0.282	7	15:00:00
May	0.461	5	03:45:00	0.461	5	03:45:00	-0.22	24	05:00:00	-0.218	24	05:00:00
Jun	0.313	1	22:00:00	0.313	1	22:00:00	-0.356	9	10:00:00	-0.353	9	10:00:00
July	0.382	26	10:00:00	0.383	26	10:00:00	-0.103	2	15:00:00	-0.102	2	15:00:00
Aug	0.358	26	08:00:00	0.359	26	08:00:00	-0.108	1	15:45:00	-0.109	1	15:45:00
Sep	0.413	16	13:30:00	0.413	16	13:30:00	-0.297	29	02:45:00	-0.296	29	02:45:00
Oct	0.444	5	00:00:00	0.445	5	00:00:00	-0.216	2	03:45:00	-0.214	2	03:45:00
Nov	0.304	7	08:15:00	0.305	7	08:15:00	-0.363	21	12:15:00	-0.361	21	12:15:00
Dec	0.612	30	09:45:00	0.612	30	09:45:00	-0.187	10	06:15:00	-0.186	10	06:15:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	2.708	22	07:00:00	2.698	22	07:00:00	-2.842	23	14:00:00	-2.846	23	14:00:00
Feb	2.878	20	06:45:00	2.866	20	06:45:00	-3.007	21	13:45:00	-3.012	21	13:45:00
Mar	2.646	22	07:00:00	2.648	22	07:00:00	-3.154	22	13:30:00	-3.152	22	13:30:00
Apr	2.53	19	18:15:00	2.531	19	18:15:00	-2.916	21	01:15:00	-2.913	21	01:15:00
May	2.516	5	18:45:00	2.517	5	18:45:00	-2.595	20	01:00:00	-2.593	20	01:00:00
Jun	2.298	4	19:00:00	2.3	4	19:00:00	-2.44	17	00:00:00	-2.438	17	00:00:00
July	2.48	3	18:45:00	2.482	3	18:45:00	-2.538	5	01:45:00	-2.536	5	01:45:00
Aug	2.821	31	19:00:00	2.822	31	19:00:00	-2.85	31	00:30:00	-2.847	31	00:30:00
Sep	2.7	1	19:45:00	2.702	1	19:45:00	-3.14	30	01:00:00	-3.137	30	01:00:00
Oct	2.955	29	06:45:00	2.956	29	06:45:00	-2.915	1	01:45:00	-2.913	1	01:45:00
Nov	2.608	27	06:15:00	2.609	27	06:15:00	-2.696	26	12:00:00	-2.694	26	12:00:00
Dec	2.645	28	07:30:00	2.646	28	07:30:00	-2.286	27	13:15:00	-2.285	27	13:15:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.19	31	0.185
February	28	0.1	28	0.096
March	31	0.053	31	0.055
April	30	0.097	30	0.098
May	31	0.168	31	0.169
June	30	0.113	30	0.115
July	31	0.199	31	0.2
August	31	0.232	31	0.234
September	30	0.227	30	0.228
October	31	0.277	31	0.279
November	30	0.28	30	0.281
December	23	0.39	23	0.391
TOTAL & AVG	357	0.194	357	0.194

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Portpatrick – Tide Gauge Information

Latitude 54° 50' 33.2" N **Longitude** 05° 07' 12.1" W **Grid Ref** NW 9976 5421

Instrument Data acquisition system with a full-tide bubbler gauge and a potentiometer attached to a Munro float gauge

Location **Tide Gauge Building** The western corner of Portpatrick harbour
Measuring Points The stilling well is directly underneath the tide gauge building

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
 The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	NW 9976 5421	Bolt Harbour wall 13.84M NE angle of building
Aux1	NW 9977 5411	Rivet E side of Jetty wall 16.6M SE angle Lifeboat HQ
Aux2	NW 9995 5412	Rivet S angle No 53 Main St
Aux3	NX 0006 5423	Church hall SE side of Rd W angle

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 1.80m below Ordnance Datum Newlyn (ODN)

TGZ = 6.827m below TGBM

Levelling No levelling was carried out in 2015

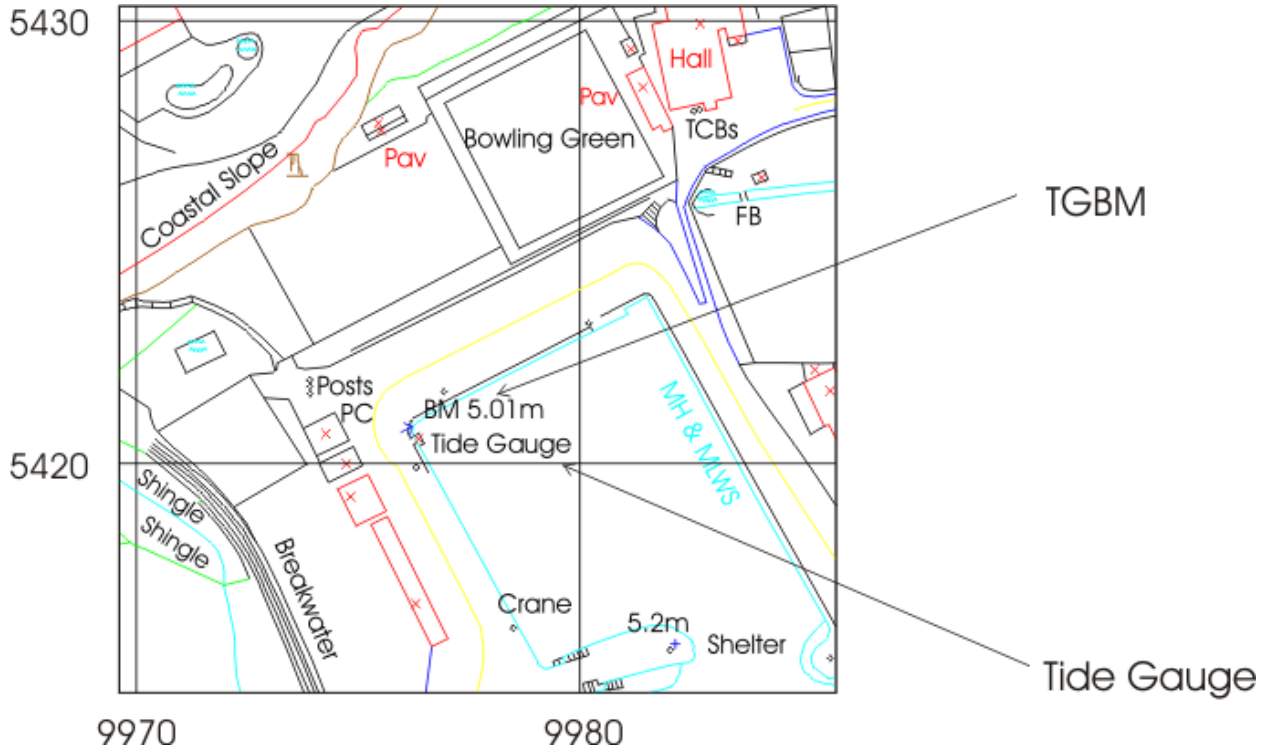
Site visits

17/02/2015 (Day 048) Maintenance on both the bubbler and float systems.

Notes on Data Quality

Channel 1 was consistently reading low and flagged throughout the year.

Portpatrick – Map & Images of Site



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Portpatrick – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan				1.378	15	04:30:00				-0.528	31	20:45:00
Feb				0.767	28	23:30:00				-0.49	7	00:30:00
Mar				0.742	31	01:15:00				-0.411	13	14:45:00
Apr				0.394	12	13:15:00				-0.296	3	21:45:00
May				0.499	5	22:15:00				-0.219	23	01:30:00
Jun				0.905	1	18:45:00				-0.388	8	15:00:00
July				0.43	6	23:30:00				-0.153	8	16:45:00
Aug				0.468	4	07:00:00				-0.107	31	11:30:00
Sep				0.293	16	12:00:00				-0.308	30	12:00:00
Oct				0.479	29	06:45:00				-0.324	12	22:45:00
Nov				0.753	12	18:30:00				-0.681	21	09:00:00
Dec				1.208	30	07:30:00				-0.353	6	18:45:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan				2.665	7	12:45:00				-1.79	24	20:45:00
Feb				2.879	22	14:00:00				-1.816	21	19:30:00
Mar				2.43	9	13:45:00				-2.057	21	18:30:00
Apr				2.146	20	12:30:00				-1.86	18	17:00:00
May				2.358	5	12:15:00				-1.658	20	06:45:00
Jun				2.569	1	23:00:00				-1.641	8	09:30:00
July				2.462	7	02:45:00				-1.54	5	07:30:00
Aug				2.692	4	01:45:00				-1.777	31	06:15:00
Sep				2.393	1	00:45:00				-1.933	30	06:30:00
Oct				2.696	29	00:00:00				-1.744	1	07:30:00
Nov				2.587	13	00:00:00				-1.691	26	05:15:00
Dec				2.996	30	14:30:00				-1.277	27	18:45:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	0	*	31	0.477
February	0	*	28	0.291
March	0	*	31	0.292
April	0	*	30	0.262
May	0	*	31	0.374
June	0	*	30	0.312
July	0	*	31	0.409
August	0	*	31	0.449
September	0	*	30	0.363
October	0	*	31	0.45
November	0	*	30	0.562
December	0	*	31	0.742
TOTAL & AVG	0	**	365	0.415

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Portrush – Tide Gauge Information

Latitude 55° 12' 24.4" N **Longitude** 06° 39' 24.6" W **Grid Ref** NW 0416 9952

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge

Location **Tide Gauge Building** Portrush RNLI boathouse

Measuring Points Fixed to a leg of the boathouse slipway

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Belfast (ODB).

Benchmark	Grid Ref	Description
TGBM	NR 0385 0018	Pin RNLI slipway
Aux1	NR 0395 0008	Cut mark wall Kerr St
Aux2	NW 0406 9992	Cut mark wall Kerr St

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 1.24m below Ordnance Datum Belfast (ODB)

TGZ = 2.844m below TGBM

Levelling No levelling was carried out in 2015

Site visits

05/02/2015 (Day 036) Clear blocking channels. Secure loose pneumatic line.

14/12/2015 (Day 348) Maintenance. Clear blocking channel.

Notes on Data Quality

Channel 1 was flagged in February and then from June onwards. The channel is blocking and reading high.

Portrush – Map & Images of Site



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Portrush – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	1.163	15	05:30:00	1.199	15	06:30:00	-0.379	31	15:00:00	-0.265	4	11:45:00
Feb	0.729	28	21:15:00	0.731	28	21:15:00	-0.378	6	01:00:00	-0.445	7	17:45:00
Mar	0.719	9	17:45:00	0.718	9	17:15:00	-0.397	4	17:00:00	-0.4	4	17:00:00
Apr	0.295	27	19:30:00	0.297	27	19:30:00	-0.268	3	23:00:00	-0.28	4	05:30:00
May	0.443	11	19:00:00	0.439	11	19:00:00	-0.245	26	21:15:00	-0.254	26	21:15:00
Jun	0.28	6	08:30:00	0.725	1	20:15:00	-0.427	8	14:15:00	-0.443	8	14:15:00
July	0.411	17	17:30:00	0.404	17	17:30:00	-0.193	8	16:00:00	-0.207	8	16:15:00
Aug	0.337	27	04:15:00	0.45	4	04:15:00	-0.047	22	23:45:00	-0.11	12	21:15:00
Sep	0.178	24	12:30:00	0.186	12	16:15:00	-0.28	30	11:00:00	-0.302	30	11:00:00
Oct	0.438	29	07:00:00	0.426	29	07:00:00	-0.213	1	14:30:00	-0.288	12	22:30:00
Nov	0.602	18	18:45:00	0.699	12	18:30:00	-0.363	21	17:45:00	-0.467	22	15:15:00
Dec	0.851	30	08:45:00	0.847	30	08:45:00	0.055	28	02:30:00	-0.267	6	18:00:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	1.345	15	04:15:00	1.381	15	04:15:00	-1.143	22	01:15:00	-1.16	22	01:15:00
Feb	1.381	19	06:30:00	1.392	19	06:30:00	-1.203	22	02:15:00	-1.194	22	02:15:00
Mar	1.156	9	20:15:00	1.155	9	20:15:00	-1.395	21	00:30:00	-1.393	21	00:30:00
Apr	1.039	19	06:45:00	1.034	19	06:45:00	-1.232	19	00:15:00	-1.229	19	00:15:00
May	1.168	18	06:15:00	1.168	18	06:15:00	-0.99	20	13:45:00	-0.994	20	13:30:00
Jun	1.119	5	20:15:00	1.365	1	18:15:00	-0.927	3	12:45:00	-0.933	3	12:45:00
July	1.245	17	19:30:00	1.237	17	19:30:00	-0.954	3	13:15:00	-0.967	3	13:15:00
Aug	0.928	26	16:30:00	1.458	3	20:45:00	-0.695	18	14:15:00	-1.147	31	13:15:00
Sep	1.299	28	18:30:00	1.277	28	18:30:00	-1.294	29	12:45:00	-1.317	29	12:45:00
Oct	1.506	27	18:15:00	1.492	27	18:15:00	-1.066	1	14:30:00	-1.092	1	14:30:00
Nov	1.223	16	09:00:00	1.515	12	18:30:00	-1.004	25	23:45:00	-1.017	25	23:45:00
Dec	1.553	30	09:15:00	1.548	30	09:15:00	-0.665	28	01:45:00	-0.763	13	01:15:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.139	25	0.187
February	8	*	22	-0.007
March	15	*	31	-0.026
April	30	-0.078	30	-0.08
May	25	0.032	31	0.014
June	1	*	30	-0.041
July	20	0.062	31	0.043
August	5	*	31	0.093
September	7	*	30	0.007
October	9	*	31	0.098
November	8	*	30	0.206
December	1	*	31	0.346
TOTAL & AVG	160	**	353	0.070

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Portsmouth – Tide Gauge Information

Latitude 50° 48' 08.1" N **Longitude** 01° 06' 40.5" W **Grid Ref** SU 6273 0068

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge

Location **Tide Gauge Building** Victory Jetty in Portsmouth Royal Naval base

Measuring Points On a leg at the north west corner of the jetty

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	SU 6269 0053	Bolt in concrete jetty TG building S angle
Aux1	SU 6330 9996	GP N side entrance to HMS Vernon
Aux2	SU 6274 0039	Building SW face 0.6M S angle
Aux3	SU 6283 0050	Building SW side of Main Rd NE face N angle

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 2.73m below Ordnance Datum Newlyn (ODN)

TGZ = 6.007m below TGBM

Levelling No levelling was carried out in 2015

Site visits

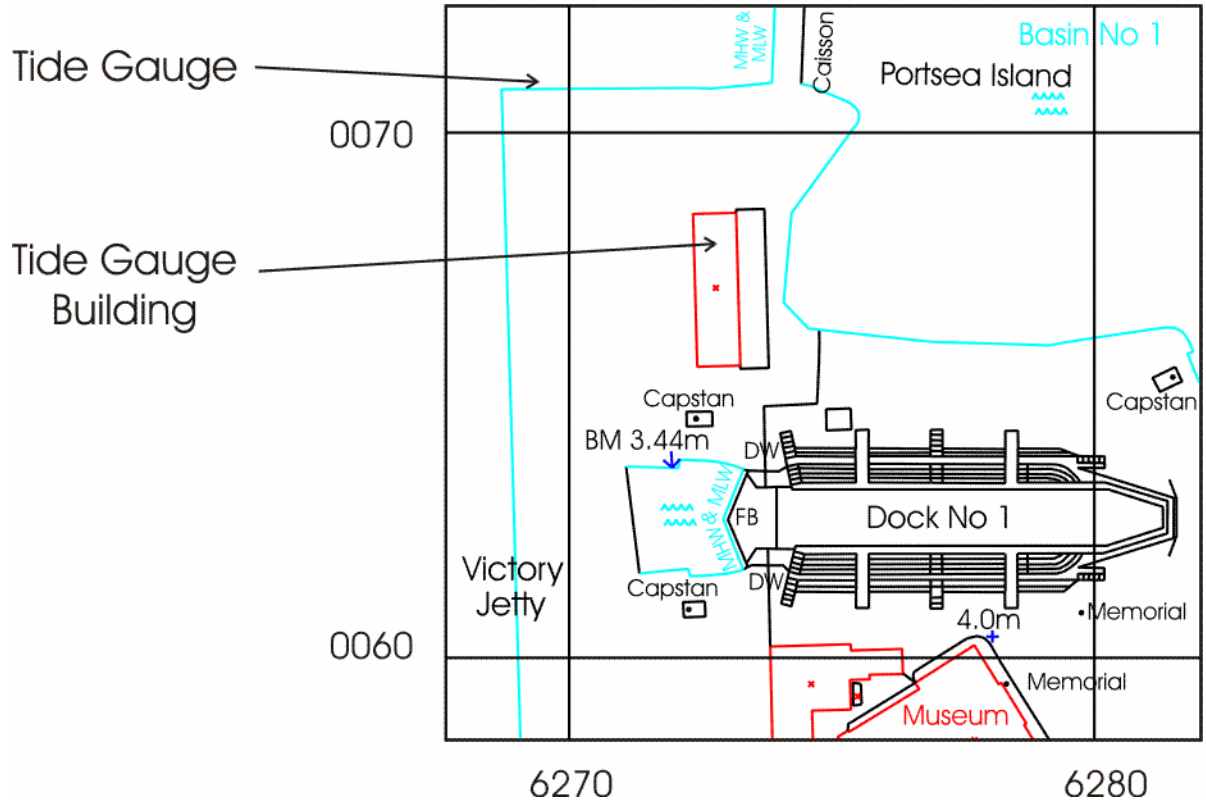
25/02/2015 (Day 056) Maintenance.

14/10/2015 (Day 287) Maintenance visit. Could not get access to tide gauge building due to a problem with the door lock. Will need to reschedule the maintenance visit and compressor change, when the lock is repaired.

Notes on Data Quality

The site exceeded the agreed target of being operational for at least 75% of each calendar month in 2015.

Portsmouth – Map & Images of Site



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Portsmouth – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	0.788	15	02:30:00	0.807	15	02:30:00	-0.516	10	15:00:00	-0.496	10	15:00:00
Feb	0.538	23	19:15:00	0.553	23	19:15:00	-0.557	7	00:30:00	-0.542	7	00:30:00
Mar	0.611	29	12:30:00	0.629	29	12:30:00	-0.422	13	03:45:00	-0.405	13	03:45:00
Apr	0.27	2	10:30:00	0.286	2	10:30:00	-0.332	7	06:45:00	-0.315	7	06:45:00
May	0.506	5	10:45:00	0.525	5	10:45:00	-0.231	21	14:45:00	-0.216	21	14:45:00
Jun	0.362	2	02:45:00	0.376	2	02:45:00	-0.406	10	09:45:00	-0.391	10	09:45:00
July	0.443	26	13:00:00	0.458	26	13:00:00	-0.185	10	06:30:00	-0.17	10	06:30:00
Aug	0.378	25	12:45:00	0.394	25	12:45:00	-0.146	21	09:45:00	-0.13	21	09:45:00
Sep	0.428	14	12:15:00	0.44	14	12:15:00	-0.403	30	00:00:00	-0.392	30	00:00:00
Oct	0.363	5	05:45:00	0.372	5	05:45:00	-0.289	23	20:45:00	-0.269	23	20:45:00
Nov	0.552	19	17:30:00	0.572	19	17:30:00	-0.319	22	06:00:00	-0.3	22	06:00:00
Dec	0.588	31	08:00:00	0.607	31	08:00:00	-0.441	4	05:45:00	-0.422	4	05:45:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	2.264	20	23:30:00	2.281	20	23:30:00	-2.456	22	18:00:00	-2.441	22	18:00:00
Feb	2.429	23	14:15:00	2.446	23	14:15:00	-2.477	20	17:45:00	-2.462	20	17:45:00
Mar	2.294	24	01:45:00	2.31	24	01:45:00	-2.683	22	05:45:00	-2.666	22	05:45:00
Apr	2.145	20	00:00:00	2.16	20	00:00:00	-2.547	18	16:15:00	-2.529	18	16:15:00
May	2.277	5	12:15:00	2.295	5	12:15:00	-2.152	20	05:45:00	-2.137	20	05:45:00
Jun	2.001	1	22:30:00	2.019	1	22:45:00	-2.106	17	04:45:00	-2.092	17	04:45:00
July	2.059	4	00:30:00	2.074	4	00:30:00	-2.155	5	06:30:00	-2.141	5	06:30:00
Aug	2.322	31	12:15:00	2.338	31	12:15:00	-2.338	31	05:15:00	-2.323	31	05:15:00
Sep	2.311	1	13:00:00	2.326	1	13:00:00	-2.683	29	05:00:00	-2.669	29	05:00:00
Oct	2.529	29	12:15:00	2.551	29	12:15:00	-2.442	1	06:15:00	-2.43	1	06:30:00
Nov	2.346	28	12:45:00	2.365	28	12:45:00	-2.287	26	16:45:00	-2.266	26	16:45:00
Dec	2.408	25	11:00:00	2.427	25	11:00:00	-1.905	27	17:45:00	-1.886	27	17:45:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.187	31	0.202
February	28	0.062	28	0.077
March	31	0.033	31	0.049
April	30	0.053	30	0.068
May	31	0.137	31	0.152
June	30	0.079	30	0.094
July	31	0.171	31	0.185
August	31	0.197	31	0.213
September	30	0.201	30	0.213
October	31	0.219	31	0.236
November	30	0.268	30	0.288
December	31	0.275	31	0.294
TOTAL & AVG	365	0.157	365	0.173

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Sheerness – Tide Gauge Information

Latitude 51° 26' 44.3" N **Longitude** 00° 44' 36.4" E **Grid Ref** TQ 9074 7542

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge

Location **Tide Gauge Building** On the jetty at Garrison Point, Port of Sheerness

Measuring Points As above

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	TQ 9080 7549	Flush bracket 11859, Garrison Fort, S angle, SW building
Aux1	TQ 9133 7532	Flush bracket G.4790, on house, NW angle, N face
Aux2	TQ 9115 7533	Wall on SW side of road, NE angle
Aux3	TQ 9147 7516	Bolt Ch. Dis, SW side of road, E face, NE angle

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 2.90m below Ordnance Datum Newlyn (ODN)

TGZ = 7.532m below TGBM

Levelling No levelling was carried out in 2015

Site visits

29/09/2015 (Day 272) Maintenance.

Notes on Data Quality

Channel 2 has been flagged throughout the year and Channel 1 was flagged in May, August, October and November. The pneumatic lines repeatedly become blocked and are then cleared.

Sheerness – Map & Images of Site



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Sheerness – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	1.669	10	23:15:00				-1.48	15	08:00:00			
Feb	0.637	26	22:00:00				-1.51	22	23:30:00			
Mar	0.92	10	18:00:00				-1.102	13	01:15:00			
Apr	0.732	1	07:00:00				-0.428	12	18:45:00			
May	0.381	10	01:30:00				-0.731	6	15:00:00			
Jun	0.367	3	10:45:00	0.278	15	02:30:00	-1.197	2	07:45:00	-0.396	10	05:15:00
July	0.874	25	14:30:00	0.127	3	16:30:00	-0.383	17	21:15:00	-0.261	13	19:15:00
Aug	0.311	24	18:00:00	0.276	5	11:30:00	-0.44	26	17:45:00	-0.283	3	11:30:00
Sep	0.651	5	13:15:00				-0.428	29	00:00:00			
Oct	0.228	6	19:30:00				-0.34	2	02:15:00			
Nov	1.325	21	13:45:00				-1.009	28	22:15:00			
Dec	0.818	6	19:30:00				-1.566	30	12:30:00			

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	3.318	24	15:15:00				-2.673	23	21:15:00			
Feb	3.53	20	13:30:00				-2.995	22	22:00:00			
Mar	3.523	21	13:15:00				-2.893	22	08:15:00			
Apr	3.093	20	01:15:00				-2.681	19	07:00:00			
May	2.997	5	01:00:00				-2.642	6	20:15:00			
Jun	3.019	3	12:45:00	2.995	18	01:15:00	-2.91	2	06:45:00	-2.393	17	07:00:00
July	3.032	4	01:45:00	3.01	4	01:45:00	-2.5	4	20:30:00	-2.508	4	20:30:00
Aug	3.439	31	01:15:00	3.167	3	02:15:00	-2.678	3	21:15:00	-2.687	3	21:15:00
Sep	3.506	1	02:00:00				-2.617	28	19:00:00			
Oct	3.226	1	14:45:00				-2.34	1	21:00:00			
Nov	3.285	28	01:45:00				-2.598	28	20:45:00			
Dec	3.188	27	13:45:00				-2.73	24	17:45:00			

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.188	0	*
February	28	0.104	0	*
March	31	0.068	0	*
April	30	0.091	0	*
May	11	*	0	*
June	30	0.103	21	0.133
July	31	0.182	6	*
August	13	0.19	4	*
September	30	0.244	0	*
October	10	*	0	*
November	15	0.277	0	*
December	31	0.107	0	*
TOTAL & AVG	291	**	31	**

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

St Mary's (Isles of Scilly) – Tide Gauge Information

Latitude 49° 55' 04.3" N **Longitude** 06° 19' 02.0" W **Grid Ref** SV 9021 1090

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge
Location **Tide Gauge Building** Cabinet in the Harbour Office storeroom on the quay, Hugh Town
Measuring Points End of the quay

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
 The statistics in this report are to Ordnance Datum Local (ODL).

Benchmark	Grid Ref	Description
TGBM	N/A	Bolt by VTS
Aux1	N/A	Bolt by VTS 2
Aux2	N/A	Bolt by top of steps
Aux3	N/A	Bolt by top of steps
Aux4	SV 9028 1097	Point above pressure points
Aux5	SV 9014 1071	Cut Mark east angle Mermaid Inn
Aux6	SV 9007 1065	Cut Mark Guard House top of Garrison Hill
VTS	SV 9023 1091	Tide staff 7.210 metre mark
VTS2	N/A	Tide staff 7.245 metre mark

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)
 TGZ = 2.91m below Ordnance Datum Local (ODL)
 TGZ = 7.425m below TGBM
 TGZ = 7.399m below Aux 1
 TGZ = 6.776m below Aux 2

Levelling No levelling was carried out in 2015

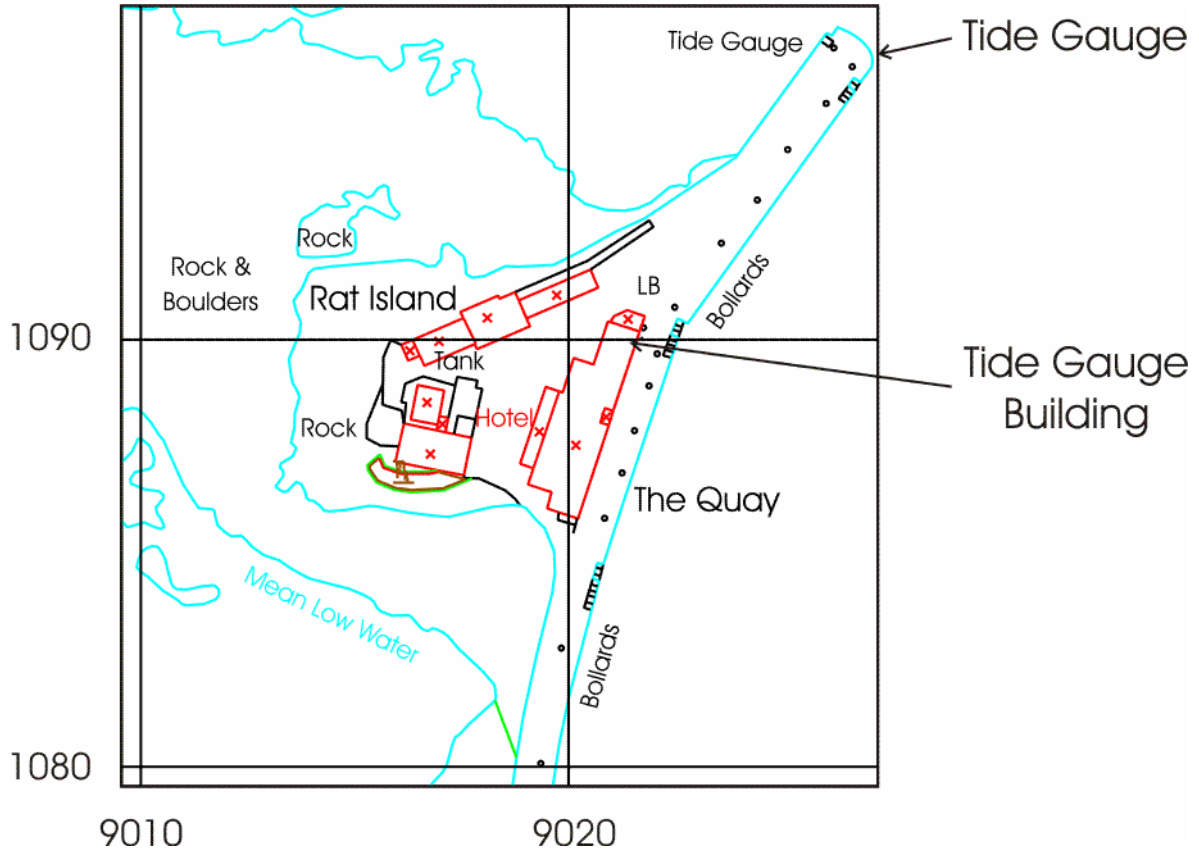
Site visits

25/03/2015 (Day 084) Compressor change.
 13/09/2015 (Day 256) Survey for new TG installation.

Notes on Data Quality

On 11 May the tide gauge was disconnected due to the redevelopment of the harbour. The communications failed on the 1st of June. The site will be unavailable until the completion of the harbour works when a new tide gauge can be installed.

St Mary's (Isles of Scilly) – Map & Images of Site



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St Mary's (Isles of Scilly) – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	0.462	14	23:15:00	0.397	14	21:30:00	-0.304	2	14:15:00	-0.311	2	14:15:00
Feb	0.226	23	10:30:00	0.149	2	18:00:00	-0.358	9	05:00:00	-0.364	9	05:00:00
Mar	0.171	26	00:30:00				-0.346	5	15:00:00			
Apr	0.198	25	12:45:00	0.102	30	23:15:00	-0.25	7	13:45:00	-0.229	21	04:45:00
May	0.355	5	01:00:00	0.341	5	01:00:00	-0.047	9	16:45:00	0.019	2	03:15:00
Jun												
July												
Aug												
Sep												
Oct												
Nov												
Dec												

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	3.21	22	05:45:00	3.21	22	05:45:00	-2.605	23	13:00:00	-2.61	23	13:00:00
Feb	3.362	21	06:15:00	2.425	4	05:30:00	-2.749	20	12:00:00	-2.166	5	12:00:00
Mar	3.28	22	05:45:00				-2.888	21	11:30:00			
Apr	3.118	19	04:45:00	2.805	21	06:15:00	-2.625	21	00:15:00	-2.685	21	00:15:00
May	2.858	5	17:30:00	2.801	4	17:00:00	-1.945	7	00:30:00	-1.785	4	11:00:00
Jun												
July												
Aug												
Sep												
Oct												
Nov												
Dec												

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.272	21	0.243
February	28	0.208	5	*
March	31	0.169	0	*
April	25	0.24	0	*
May	10	*	1	*
June	0	*	0	*
July	0	*	0	*
August	0	*	0	*
September	0	*	0	*
October	0	*	0	*
November	0	*	0	*
December	0	*	0	*
TOTAL & AVG	125	**	27	**

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Stornoway – Tide Gauge Information

Latitude 58° 12' 28.1" N **Longitude** 06° 23' 20.3" W **Grid Ref** NB 4228 3274

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge

Location **Tide Gauge Building** By the weighbridge at the entrance to Stornoway Port Authority, No. 2 wharf

Measuring Points Attached to a leg on the east side of the wharf

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Local (ODL).

Benchmark	Grid Ref	Description
TGBM	NB 4228 3264	OSBM bolt E side of No 2 wharf
Aux1	NB 4215 3271	OSBM bolt STS NE angle King Edwards Wharf
Aux2	NB 4212 3275	Amity House E side of Espl Rd N face NW angle
Aux3	NB 4223 3280	BK S side Worth Beach NW angle N face

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 2.71m below Ordnance Datum Local (ODL)

TGZ = 6.368m below TGBM

Levelling No levelling was carried out in 2015

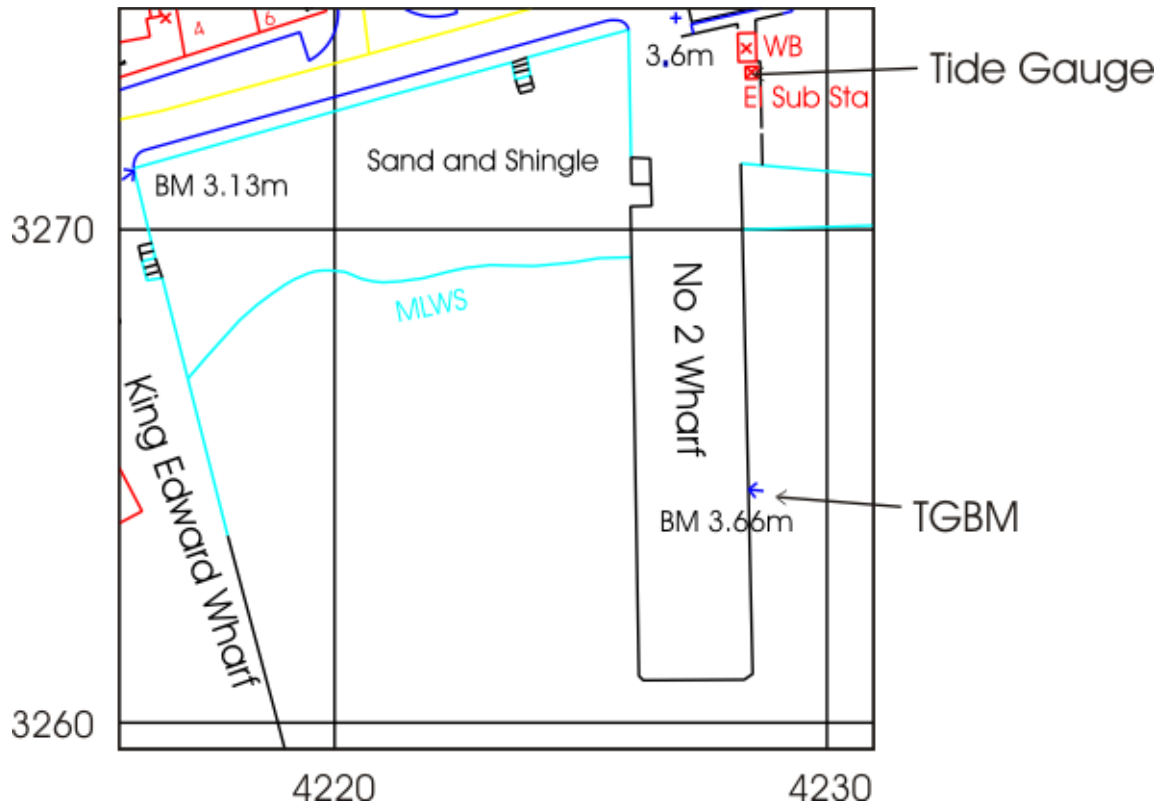
Site visits

No site visits were carried out in 2015

Notes on Data Quality

On 06 November 2014 all three channels were lost as the pneumatic lines were severed by a pontoon that came adrift in a storm. The lines were repaired on 02 December 2014 but Channel 2 has been recording low (particularly over high waters) and the channel has been flagged from January to December. This is due to an issue with the pressure.

Stornoway – Map & Images of Site



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Stornoway – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	0.847	15	05:15:00	0.084	5	22:15:00	-0.448	31	23:45:00	-0.451	31	23:45:00
Feb	0.59	23	14:00:00	0.285	15	19:15:00	-0.564	7	16:30:00	-0.573	7	16:30:00
Mar	0.685	9	22:30:00	0.236	23	02:15:00	-0.306	14	02:00:00	-0.284	21	15:15:00
Apr	0.278	10	21:15:00				-0.254	4	02:30:00			
May	0.529	11	22:15:00				-0.212	23	00:30:00			
Jun	0.435	2	07:15:00				-0.347	8	13:00:00			
July	0.353	21	03:45:00	0.27	18	03:15:00	-0.118	30	02:00:00	0.063	19	15:15:00
Aug	0.45	4	16:00:00				-0.127	31	07:45:00			
Sep	0.251	13	03:00:00	0.236	16	15:00:00	-0.271	30	03:45:00	-0.289	30	03:45:00
Oct	0.465	22	04:45:00	-0.08	2	03:00:00	-0.225	1	03:15:00	-0.253	1	08:15:00
Nov	0.824	13	04:00:00				-0.393	22	05:15:00			
Dec	0.81	30	05:15:00				-0.158	1	03:00:00			

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	2.785	23	08:45:00	2.115	6	07:15:00	-2.473	22	14:30:00	-1.687	6	14:00:00
Feb	2.951	20	07:15:00	1.63	3	06:45:00	-2.584	21	14:45:00	-2.166	7	15:30:00
Mar	2.641	22	08:00:00	1.675	18	17:45:00	-2.879	21	13:45:00	-2.877	21	13:45:00
Apr	2.367	19	06:45:00				-2.612	19	13:15:00			
May	2.433	18	06:30:00				-2.179	20	02:15:00			
Jun	2.267	5	20:45:00				-1.959	4	01:45:00			
July	2.439	31	19:00:00	-0.493	17	11:45:00	-2.118	4	02:15:00	-1.663	19	02:45:00
Aug	2.747	3	21:00:00				-2.558	31	01:45:00			
Sep	2.78	28	18:45:00	2.739	28	18:45:00	-2.729	30	02:00:00	-2.739	30	02:00:00
Oct	2.908	28	19:15:00	2.049	1	08:45:00	-2.532	1	02:45:00	-2.545	1	02:45:00
Nov	2.633	13	07:15:00				-2.28	26	00:45:00			
Dec	2.692	24	05:45:00				-1.881	26	13:30:00			

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.34	1	*
February	28	0.152	5	*
March	31	0.165	0	*
April	30	0.079	0	*
May	31	0.18	0	*
June	30	0.125	0	*
July	31	0.205	0	*
August	31	0.275	0	*
September	30	0.196	15	0.206
October	31	0.305	0	*
November	30	0.425	0	*
December	31	0.534	0	*
TOTAL & AVG	365	0.248	21	**

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Tobermory – Tide Gauge Information

Latitude 56° 37' 23.2" N **Longitude** 06° 03' 51.2" W **Grid Ref** NM 5079 5531

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge

Location **Tide Gauge Building** In the Caledonian MacBrayne ferry terminal on Mishnish Pier

Measuring Points Attached to a leg of the pier

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	NM 5069 5530	F bracket G5186 on SW angle of Royal bldg
Aux2	NM 5077 5529	NBM rivet in sea wall of Mishnish Pier

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 2.39m below Ordnance Datum Newlyn (ODN)

TGZ = Chart Datum = 6.856m below TGBM

Levelling No levelling was carried out in 2015

Site visits

24/11/2015 (Day 328) Maintenance. Compressor change.

Notes on Data Quality

Channel 1 was blocking and the data have been flagged in January and then again from October to December.

Tobermory – Map & Images of Site



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Tobermory – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	0.407	28	06:00:00	1.395	15	05:00:00	-0.58	31	23:15:00	-0.585	31	23:15:00
Feb	0.844	28	22:45:00	0.84	28	22:45:00	-0.56	1	00:00:00	-0.564	1	00:00:00
Mar	0.935	9	16:45:00	0.932	9	16:45:00	-0.404	10	15:30:00	-0.408	10	15:30:00
Apr	0.303	27	16:45:00	0.3	27	16:45:00	-0.277	4	00:30:00	-0.281	4	00:30:00
May	0.522	11	21:00:00	0.519	11	21:00:00	-0.205	22	23:45:00	-0.207	22	23:45:00
Jun	0.861	1	22:00:00	0.858	1	22:00:00	-0.38	8	14:30:00	-0.383	8	14:30:00
July	0.51	17	20:00:00	0.508	17	20:00:00	-0.142	8	17:15:00	-0.146	8	17:15:00
Aug	0.518	4	03:45:00	0.513	4	03:45:00	-0.097	31	15:30:00	-0.102	31	15:30:00
Sep	0.258	13	01:15:00	0.255	13	01:15:00	-0.267	30	13:30:00	-0.272	30	13:30:00
Oct	0.379	5	18:45:00	0.422	29	07:15:00	-0.235	13	00:00:00	-0.239	13	00:00:00
Nov	0.116	3	03:45:00	0.827	12	20:15:00	-0.05	1	21:45:00	-0.443	21	07:15:00
Dec				0.957	30	09:15:00				-0.213	7	01:15:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	1.633	28	12:30:00	2.766	23	08:00:00	-1.336	31	22:30:00	-2.104	22	01:00:00
Feb	2.814	20	06:45:00	2.81	20	06:45:00	-2.181	22	02:00:00	-2.185	22	02:00:00
Mar	2.605	22	07:15:00	2.602	22	07:00:00	-2.428	21	12:45:00	-2.432	21	12:45:00
Apr	2.434	19	06:00:00	2.431	19	06:00:00	-2.19	20	00:45:00	-2.194	20	00:45:00
May	2.475	18	05:45:00	2.473	18	05:45:00	-1.825	20	13:30:00	-1.828	20	13:30:00
Jun	2.459	1	17:45:00	2.455	1	17:45:00	-1.615	18	13:15:00	-1.618	18	13:15:00
July	2.511	17	18:45:00	2.508	17	18:45:00	-1.687	3	12:45:00	-1.691	3	12:45:00
Aug	2.757	3	20:00:00	2.754	3	20:00:00	-2.115	31	13:00:00	-2.119	31	13:00:00
Sep	2.721	28	18:00:00	2.718	28	18:00:00	-2.301	30	01:00:00	-2.305	30	01:00:00
Oct	2.245	1	20:00:00	2.946	29	06:45:00	-2.136	1	01:45:00	-2.139	1	01:45:00
Nov	1.919	1	08:30:00	2.888	12	18:15:00	-1.264	1	03:00:00	-1.934	25	23:45:00
Dec				2.769	30	09:00:00				-1.418	12	00:30:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	3	*	31	0.457
February	28	0.264	28	0.26
March	31	0.285	31	0.282
April	30	0.216	30	0.213
May	31	0.327	31	0.323
June	30	0.276	30	0.273
July	31	0.36	31	0.357
August	31	0.419	31	0.416
September	30	0.324	30	0.322
October	15	*	31	0.424
November	2	*	30	0.541
December	0	*	31	0.688
TOTAL & AVG	262	**	365	0.380

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Ullapool – Tide Gauge Information

Latitude 57° 53' 42.9" N **Longitude** 05° 09' 28.4" W **Grid Ref** NH 1293 9391

Instrument Data acquisition system with a full-tide bubbler gauge and a back-up potentiometer attached to a Munro float gauge

Location **Tide Gauge Building** On the Ullapool harbour pier
Measuring Points Below the tide gauge building

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	NH 1288 9391	OSBM Pier NW Para 8.2M NE steps
Aux1	NH 1303 9425	PA bolt Church SW side of road NE face N angle
Aux2	NH 1288 9398	No 8 Shore Street SE face 0.3M S angle
Aux3	NH 1253 9376	Rivet Fnd No 21 West Shore Street S angle

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 2.75m below Ordnance Datum Newlyn (ODN)

TGZ = 7.155m below TGBM

Levelling No levelling was carried out in 2015

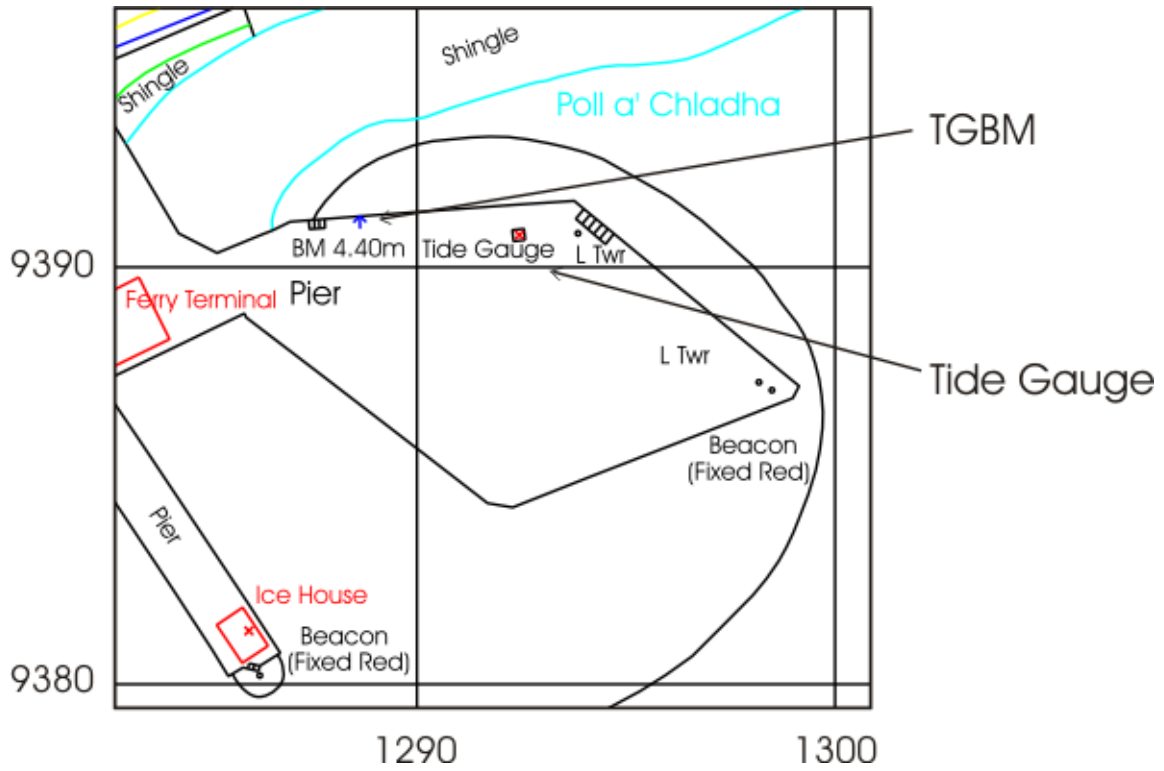
Site visits

No site visits were carried out in 2015

Notes on Data Quality

In June Channel 1 was flagged as it was reading low on rising tides (worse on rising spring tides).

Ullapool – Map & Images of Site



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Ullapool – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	1.123	9	03:45:00	1.14	9	03:45:00	-0.51	31	23:45:00	-0.488	31	23:45:00
Feb	0.603	23	13:30:00	0.627	23	13:30:00	-0.639	1	01:15:00	-0.611	1	01:15:00
Mar	0.944	9	22:15:00	0.948	9	22:15:00	-0.423	14	01:30:00	-0.405	14	01:30:00
Apr	0.308	14	02:15:00	0.333	14	02:15:00	-0.373	4	03:00:00	-0.331	4	02:30:00
May	0.559	12	00:15:00	0.596	12	00:15:00	-0.145	1	02:30:00	-0.108	1	05:00:00
Jun	0.391	6	10:30:00	0.415	6	10:30:00	-0.376	8	12:30:00	-0.353	8	12:30:00
July	0.347	21	03:30:00	0.373	21	03:30:00	-0.188	30	02:00:00	-0.15	30	02:00:00
Aug	0.408	4	15:30:00	0.45	4	17:15:00	-0.19	31	16:30:00	-0.145	31	08:30:00
Sep	0.217	16	13:30:00	0.258	13	02:15:00	-0.299	4	22:30:00	-0.317	30	04:00:00
Oct	0.525	22	04:30:00	0.556	22	04:30:00	-0.32	13	03:15:00	-0.282	12	22:00:00
Nov	0.91	13	03:30:00	0.943	13	03:30:00	-0.492	22	05:15:00	-0.47	22	05:15:00
Dec	0.856	30	11:00:00	0.875	30	11:00:00	-0.26	13	16:15:00	-0.232	13	16:15:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	3.053	23	09:00:00	3.079	23	09:00:00	-2.559	22	14:30:00	-2.54	22	14:30:00
Feb	3.215	20	07:30:00	3.243	20	07:30:00	-2.662	21	15:00:00	-2.637	21	15:00:00
Mar	2.927	22	08:00:00	2.957	22	08:00:00	-2.955	21	14:00:00	-2.931	21	14:00:00
Apr	2.644	19	07:00:00	2.68	19	06:45:00	-2.675	18	12:45:00	-2.647	18	12:45:00
May	2.471	5	19:45:00	2.508	5	19:45:00	-1.87	7	02:45:00	-1.842	7	02:45:00
Jun	2.478	5	21:15:00	2.541	5	21:00:00	-1.998	4	01:45:00	-2.003	4	02:00:00
July	2.677	31	19:00:00	2.707	31	19:00:00	-2.223	4	02:15:00	-2.197	4	02:15:00
Aug	2.983	31	19:45:00	3.018	31	19:45:00	-2.62	31	01:45:00	-2.595	31	01:45:00
Sep	2.794	1	20:30:00	3.062	28	19:00:00	-2.828	30	02:00:00	-2.797	30	02:00:00
Oct	3.139	28	19:15:00	3.178	28	19:15:00	-2.351	28	01:15:00	-2.584	1	02:45:00
Nov	2.986	27	07:30:00	2.999	27	07:30:00	-2.436	26	00:45:00	-2.406	26	00:45:00
Dec	2.998	24	05:45:00	3.019	24	05:45:00	-1.955	26	13:45:00	-1.932	26	13:45:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.487	31	0.502
February	28	0.275	28	0.299
March	31	0.287	31	0.313
April	30	0.187	30	0.217
May	11	*	11	*
June	9	*	28	0.243
July	31	0.304	31	0.335
August	31	0.372	31	0.403
September	19	0.256	30	0.315
October	29	0.406	31	0.427
November	30	0.534	30	0.562
December	31	0.665	31	0.686
TOTAL & AVG	311	**	343	0.389

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Weymouth – Tide Gauge Information

Latitude 50° 36' 30.6" N **Longitude** 02° 26' 52.6" W **Grid Ref** SY 6840 7885

Instrument Data acquisition system with two full-tide bubbler gauges
Location **Tide Gauge Building** Commercial Pier, next to the ferry terminal
Measuring Points On the pier wall, directly in front of the tide gauge building

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
 The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	SY 6826 7882	Bolt corner of quay wall NW side N angle
Aux1	SY 6822 7886	Bolt sea wall 5.5M W steps
Aux2	SY 6813 7888	Right base NW pillar NE entrance Alexandra gardens
Aux3	SY 6810 7893	Bolt sea wall 10.1M NW shelter
Aux4	SY 6806 7908	Bolt N base STS aquarium E side of esplanade
REFBM	SY 6837 7884	Bolt concrete SW corner of building next to tide gauge hut

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)
 TGZ = 1.02m below Ordnance Datum Newlyn (ODN)
 TGZ = 4.334m below TGBM

Levelling No levelling was carried out in 2015

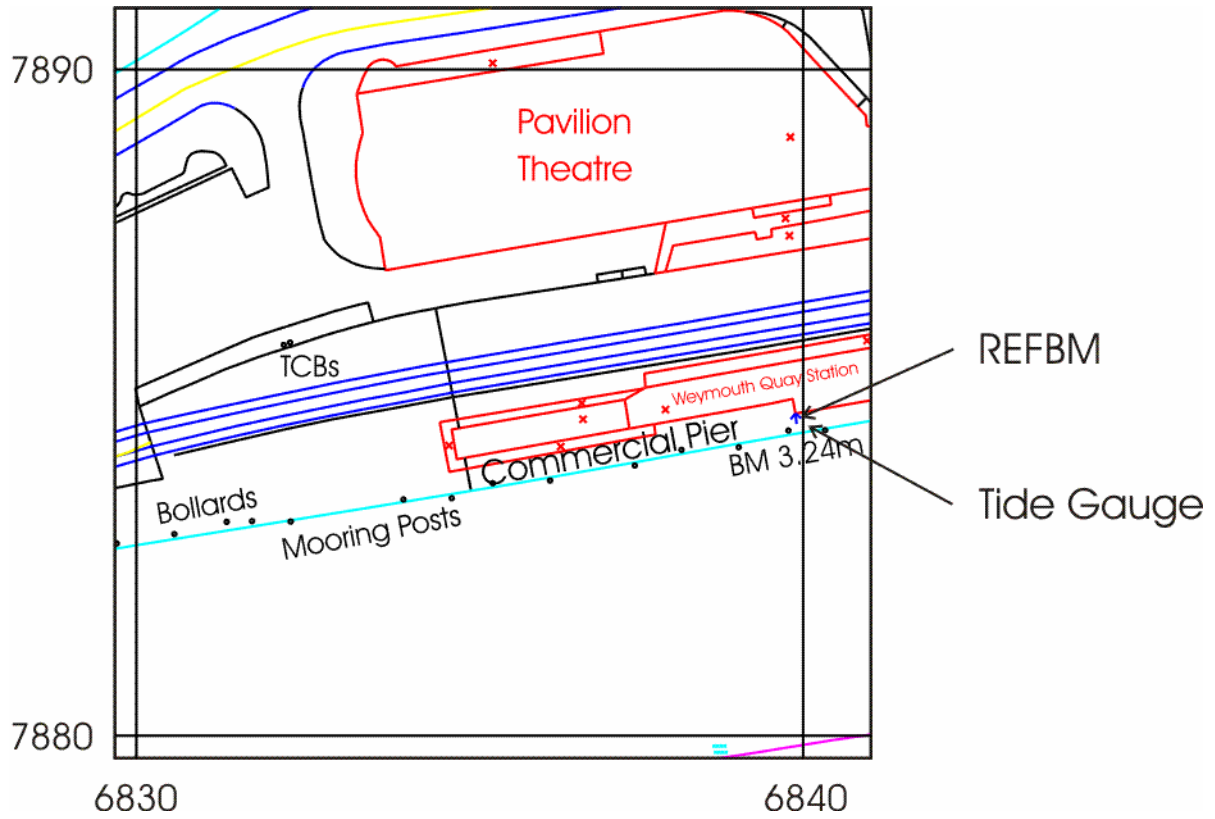
Site visits

26/02/2015 (Day 057) Compressor change.
 14/10/2015 (Day 287) Maintenance. Compressor changed.

Notes on Data Quality

Channel 2 has been flagged in August and from October to December due to the line blocking.

Weymouth – Map & Images of Site



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Weymouth – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	0.666	15	02:30:00	0.7	15	02:30:00	-0.507	10	16:00:00	-0.479	10	16:00:00
Feb	0.39	23	16:00:00	0.424	23	16:00:00	-0.556	7	01:30:00	-0.521	7	01:30:00
Mar	0.3	29	12:15:00	0.334	29	12:15:00	-0.472	12	04:30:00	-0.43	5	12:00:00
Apr	0.178	2	11:00:00	0.21	2	11:00:00	-0.371	7	06:15:00	-0.343	7	06:15:00
May	0.432	5	13:00:00	0.46	5	13:00:00	-0.283	21	13:45:00	-0.244	21	13:45:00
Jun	0.288	1	21:15:00	0.317	1	21:15:00	-0.464	9	08:30:00	-0.438	9	08:30:00
July	0.316	26	12:15:00	0.344	26	12:15:00	-0.222	2	13:45:00	-0.198	2	13:45:00
Aug	0.35	26	07:00:00	0.378	26	07:00:00	-0.171	2	02:15:00	-0.133	2	02:30:00
Sep	0.408	16	13:30:00	0.349	14	04:15:00	-0.389	29	01:30:00	-0.349	29	01:30:00
Oct	0.35	5	01:00:00	0.396	5	03:15:00	-0.292	2	02:00:00	-0.255	2	02:00:00
Nov	0.335	17	00:30:00				-0.368	21	10:30:00			
Dec	0.474	30	06:45:00				-0.403	4	07:00:00			

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	1.586	21	07:15:00	1.62	21	07:15:00	-1.149	22	16:15:00	-1.119	22	16:15:00
Feb	1.676	20	07:45:00	1.711	20	07:45:00	-1.21	20	16:00:00	-1.178	20	16:00:00
Mar	1.505	21	07:45:00	1.545	21	07:45:00	-1.255	20	14:45:00	-1.217	22	16:30:00
Apr	1.406	19	19:30:00	1.434	19	19:30:00	-1.185	18	14:30:00	-1.156	18	14:30:00
May	1.466	5	19:45:00	1.495	5	19:45:00	-0.887	20	04:00:00	-0.85	20	04:00:00
Jun	1.281	1	18:15:00	1.308	1	18:15:00	-0.836	7	05:45:00	-0.81	7	05:45:00
July	1.446	3	20:00:00	1.474	3	20:00:00	-0.901	5	05:00:00	-0.87	5	05:00:00
Aug	1.675	31	20:00:00	1.709	31	20:00:00	-1.044	2	03:45:00	-1.005	2	03:45:00
Sep	1.588	1	21:00:00	1.622	1	21:00:00	-1.321	29	03:15:00	-1.281	29	03:15:00
Oct	1.803	29	07:45:00	1.422	1	09:00:00	-1.049	1	04:45:00	-1.014	1	04:45:00
Nov	1.527	28	08:45:00				-0.91	26	15:00:00			
Dec	1.566	25	06:30:00				-0.695	27	16:00:00			

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.188	31	0.217
February	28	0.079	28	0.111
March	31	0.043	31	0.082
April	30	0.072	30	0.1
May	31	0.157	31	0.187
June	30	0.102	30	0.134
July	31	0.192	31	0.218
August	31	0.222	10	*
September	30	0.222	22	0.22
October	31	0.259	12	0.305
November	30	0.285	0	*
December	31	0.324	0	*
TOTAL & AVG	365	0.179	256	**

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Whitby – Tide Gauge Information

Latitude 54° 29' 24.0" N **Longitude** 00° 36' 52.9" W **Grid Ref** NZ 8984 1140

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge

Location **Tide Gauge Building** In the Harbourmaster's office

Measuring Points Underneath the quay, next to the Harbour Office

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	NZ 8986 1141	E side of Pier Rd
Aux1	NZ 8992 1105	Bolt butt of Whitby Bridge
Aux2	NZ 8985 1134	Rivet quayside SE side of Pier Rd
Aux3	NZ 8983 1142	Rivet wall angle S side of road angle of lifeboat museum

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 3.00m below Ordnance Datum Newlyn (ODN)

TGZ = 9.105m below TGBM

Levelling No levelling was carried out in 2015

Site visits

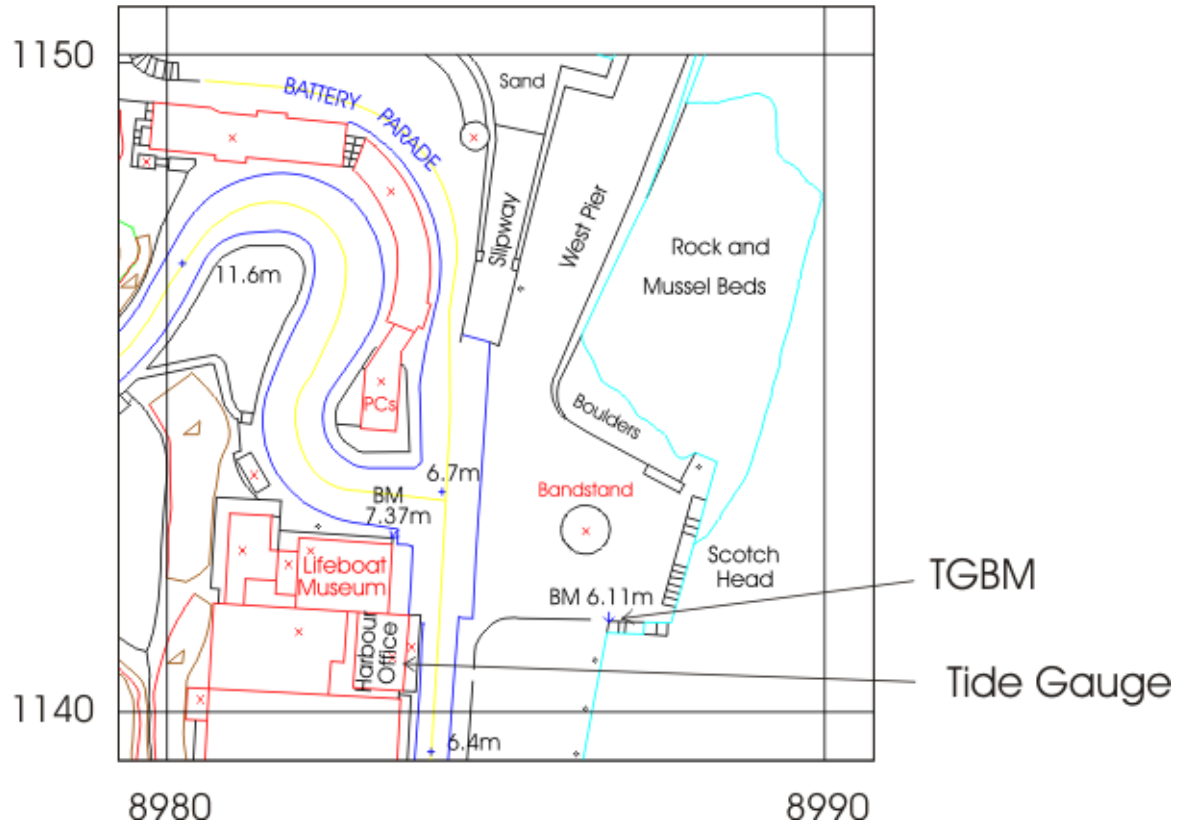
28/04/2015 (Day 118) Survey of the site following harbour works in the vicinity of the tide gauge.

29/10/2015 (Day 302) Maintenance. Compressor change.

Notes on Data Quality

Both channels are flagged from April onwards. The site suffers from siltation and in the past the pressure points have become buried due to siltation at the site.

Whitby – Map & Images of Site



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Whitby – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	1.113	10	17:30:00	1.113	10	17:30:00	-0.531	15	07:00:00	-0.529	15	07:00:00
Feb	0.641	1	08:30:00	0.644	1	08:30:00	-0.43	28	04:00:00	-0.425	28	04:00:00
Mar	1.069	10	10:00:00	1.074	10	10:00:00	-0.69	11	15:30:00	-0.685	11	15:30:00
Apr	0.602	1	00:15:00	0.622	1	00:15:00	-0.201	4	13:15:00	-0.204	8	14:15:00
May												
Jun												
July												
Aug												
Sep				0.505	5	13:00:00				-0.078	8	10:15:00
Oct				0.255	7	15:00:00				0.031	7	21:30:00
Nov	0.75	30	00:15:00				-0.195	26	12:00:00			
Dec	0.736	23	00:15:00				-0.371	28	14:45:00			

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	3.258	10	18:45:00	3.259	10	18:45:00	-2.238	23	11:45:00	-2.233	23	11:45:00
Feb	3.333	21	17:45:00	3.336	21	17:45:00	-2.241	22	12:15:00	-2.23	22	12:15:00
Mar	3.312	23	18:00:00	3.316	23	18:00:00	-2.247	10	00:00:00	-2.237	10	00:00:00
Apr	2.459	22	06:15:00	2.982	19	16:15:00	-2.269	17	21:15:00	-2.219	21	11:15:00
May												
Jun												
July												
Aug												
Sep				3.222	3	06:45:00				-1.713	3	13:15:00
Oct				1.863	8	13:15:00				-0.936	8	07:00:00
Nov	3.282	27	16:45:00				-2.176	26	10:15:00			
Dec	3.236	25	15:45:00				-2.145	29	00:15:00			

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.561	31	0.562
February	28	0.403	28	0.408
March	30	0.381	30	0.388
April	4	*	19	0.377
May	0	*	0	*
June	0	*	0	*
July	0	*	0	*
August	0	*	0	*
September	0	*	6	*
October	0	*	0	*
November	5	*	0	*
December	5	*	0	*
TOTAL & AVG	103	**	114	**

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Wick – Tide Gauge Information

Latitude 58° 26' 27.5" N **Longitude** 03° 05' 10.7" W **Grid Ref** ND 3668 5081

Instrument Data acquisition system with two full-tide and a mid-tide bubbler gauge
Location **Tide Gauge Building** Northwest corner of Wick harbour, next to the ship repair slipway
Measuring Points Attached to an unused stilling well beneath the building

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
TGBM	ND 3667 5081	New OSBM bolt quay E angle tide gauge building
Aux1	ND 3670 5084	Rivet base of wall 15.5M NE angle of building
Aux2	ND 3670 5083	NBM rivet base SE end of wall NE side of N pier
Aux3	ND 3705 5055	Wall base of steps SE side of pier

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)
TGZ = 1.71m below Ordnance Datum (ODN)
TGZ = 5.084m below TGBM

Levelling No levelling was carried out in 2015

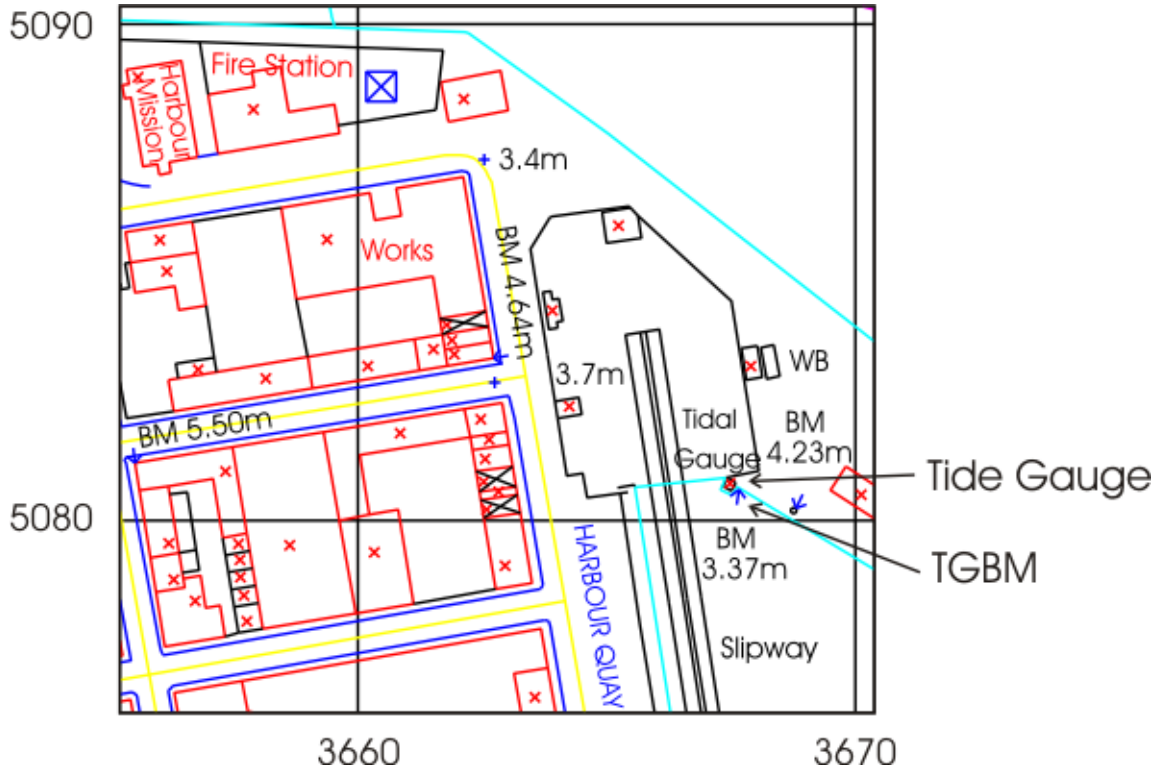
Site visits

18/02/2015 (Day 049) Diving to clear a blocking channel. Survey of steelwork.

Notes on Data Quality

Channel 2 was flagged in January, July and August and Channel 1 was flagged in February, June, November and December. There is a known problem with blocking at this site and several attempts were made throughout the year to clear blockages.

Wick – Map & Images of Site



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Wick – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	0.844	12	19:45:00	-0.226	31	14:15:00	-0.365	31	20:45:00	-0.384	31	20:45:00
Feb	0.492	23	06:15:00	0.49	23	06:15:00	-0.285	15	04:15:00	-0.424	7	21:45:00
Mar	0.671	7	09:15:00	0.67	7	09:15:00	-0.357	14	12:15:00	-0.361	14	12:15:00
Apr	0.333	14	07:15:00	0.33	14	07:15:00	-0.256	4	08:45:00	-0.258	4	08:45:00
May	0.507	12	02:00:00	0.505	12	02:00:00	-0.182	23	04:15:00	-0.185	23	04:15:00
Jun	0.205	28	20:00:00	0.397	2	11:15:00	-0.171	15	16:45:00	-0.289	9	10:00:00
July	0.276	21	11:30:00	0.18	1	20:00:00	-0.127	16	17:30:00	-0.088	2	23:00:00
Aug	0.32	27	00:00:00	0.184	29	16:00:00	-0.138	31	11:00:00	-0.14	31	11:00:00
Sep	0.242	16	18:00:00	0.24	16	18:00:00	-0.245	7	00:00:00	-0.247	7	00:00:00
Oct	0.543	22	13:15:00	0.541	22	13:15:00	-0.263	12	22:45:00	-0.265	12	22:45:00
Nov	1.01	13	08:15:00	1.008	13	08:15:00	-0.053	8	18:00:00	-0.386	22	11:30:00
Dec				0.776	5	08:30:00				-0.242	7	17:30:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	2.33	9	14:15:00	0.981	31	21:15:00	-1.544	22	18:30:00	-0.801	31	15:15:00
Feb	2.349	19	11:30:00	2.347	19	11:30:00	-1.515	21	19:15:00	-1.517	21	19:15:00
Mar	2.256	23	13:15:00	2.253	23	13:15:00	-1.869	21	18:00:00	-1.871	21	18:00:00
Apr	1.837	20	12:15:00	1.834	20	12:15:00	-1.69	18	17:00:00	-1.692	18	17:00:00
May	2.022	18	11:15:00	2.019	18	11:15:00	-1.336	20	06:15:00	-1.338	20	06:15:00
Jun	1.812	18	00:00:00	1.881	6	01:15:00	-1.2	19	06:45:00	-1.236	8	08:45:00
July	1.956	31	23:15:00	1.803	2	23:45:00	-1.329	4	06:15:00	-1.299	4	06:15:00
Aug	2.244	4	01:30:00	2.172	30	23:45:00	-1.566	31	05:45:00	-1.568	31	05:45:00
Sep	2.159	1	00:30:00	2.157	1	00:30:00	-1.675	30	06:15:00	-1.676	30	06:15:00
Oct	2.281	30	00:45:00	2.029	1	01:00:00	-1.434	1	07:00:00	-1.437	1	07:00:00
Nov	2.454	13	12:00:00	2.451	13	12:00:00	-0.694	12	05:00:00	-1.289	26	04:45:00
Dec				2.392	24	10:15:00				-1.091	26	17:45:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	28	0.52	0	*
February	15	0.413	27	0.308
March	31	0.306	31	0.304
April	30	0.24	30	0.238
May	23	0.332	31	0.326
June	18	0.289	18	0.249
July	31	0.343	0	*
August	31	0.401	2	*
September	25	0.332	30	0.338
October	31	0.431	23	0.399
November	12	*	30	0.582
December	0	*	31	0.647
TOTAL & AVG	275	**	253	**

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing

Workington – Tide Gauge Information

Latitude 54° 39' 02.6" N **Longitude** 03° 34' 01.8" W **Grid Ref** NX 9898 2953

Instrument Data acquisition system with two full-tide bubbler gauges

Location **Tide Gauge Building** North side of the dock entrance

Measuring Points Behind fender piles on the north seaward side of the dock gates

Datum The delayed-mode data are to Admiralty Chart Datum (ACD).
The statistics in this report are to Ordnance Datum Newlyn (ODN).

Benchmark	Grid Ref	Description
Aux1	NX 9917 2928	Building SW face 3.7M from S angle Workington Dock
Aux2	NX 9948 2967	NBM works building S side Rd N face NE angle

Benchmark Relationships

TGZ = Admiralty Chart Datum (ACD)

TGZ = 4.20m below Ordnance Datum Newlyn (ODN)

TGZ = 11.59m below Aux1

Levelling No levelling was carried out in 2015

Site visits

16/07/2015 (Day 197) Maintenance.

Notes on Data Quality

The site exceeded the agreed target of being operational for at least 75% of each calendar month in 2015.

Workington – Map & Images of Site



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Workington – Statistics

	Surge Maxima						Surge Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	1.491	15	04:00:00	1.493	15	04:00:00	-0.702	31	20:00:00	-0.698	31	20:00:00
Feb	0.871	28	23:45:00	0.878	28	23:45:00	-0.63	6	23:15:00	-0.632	6	23:15:00
Mar	1.06	31	02:15:00	1.066	31	02:15:00	-0.579	13	15:00:00	-0.573	13	15:00:00
Apr	0.496	12	11:00:00	0.502	12	11:00:00	-0.399	4	08:30:00	-0.399	4	08:30:00
May	0.632	5	14:00:00	0.638	5	14:00:00	-0.315	23	00:30:00	-0.313	23	00:30:00
Jun	1.098	1	19:00:00	1.102	1	19:00:00	-0.525	8	18:15:00	-0.522	8	18:15:00
July	0.452	7	00:00:00	0.443	7	00:00:00	-0.21	30	02:00:00	-0.203	30	02:00:00
Aug	0.592	4	07:15:00	0.588	4	07:15:00	-0.206	31	09:00:00	-0.207	12	13:00:00
Sep	0.285	12	20:15:00	0.29	12	20:15:00	-0.434	30	09:30:00	-0.426	30	09:30:00
Oct	0.47	29	09:15:00	0.477	29	09:15:00	-0.415	12	21:30:00	-0.41	12	21:30:00
Nov	0.922	12	18:00:00	0.93	12	18:00:00	-0.995	21	10:00:00	-0.989	21	10:00:00
Dec	1.228	30	09:00:00	1.231	30	09:00:00	-0.545	6	18:15:00	-0.541	6	18:15:00

	Extreme Maxima						Extreme Minima					
	Channel 1			Channel 2			Channel 1			Channel 2		
	Value	Day	Time	Value	Day	Time	Value	Day	Time	Value	Day	Time
Jan	5.001	23	13:15:00	5.003	23	13:15:00	-3.998	22	19:15:00	-3.99	22	19:15:00
Feb	5.161	22	13:45:00	5.164	22	13:45:00	-4.024	20	19:00:00	-4.034	20	19:00:00
Mar	4.88	22	12:45:00	4.881	22	12:45:00	-4.176	21	18:00:00	-4.166	21	18:00:00
Apr	4.548	19	11:30:00	4.535	20	12:15:00	-4.066	18	17:30:00	-4.076	18	17:30:00
May	4.491	18	11:30:00	4.485	18	11:30:00	-3.533	20	07:00:00	-3.527	20	07:00:00
Jun	4.493	1	23:00:00	4.497	1	23:00:00	-3.3	18	06:45:00	-3.293	18	06:45:00
July	4.393	31	23:30:00	4.396	31	23:30:00	-3.517	5	07:45:00	-3.509	5	07:45:00
Aug	4.936	4	01:45:00	4.922	4	01:45:00	-3.898	31	07:00:00	-3.894	31	07:00:00
Sep	4.888	1	00:45:00	4.868	1	00:45:00	-4.23	30	07:00:00	-4.237	30	07:00:00
Oct	5.108	29	00:00:00	5.109	29	00:00:00	-3.97	1	07:30:00	-3.967	1	07:30:00
Nov	4.836	28	12:45:00	4.839	28	12:45:00	-3.691	26	05:30:00	-3.687	26	05:30:00
Dec	4.682	24	10:15:00	4.685	24	10:15:00	-3.039	27	19:15:00	-3.033	27	19:15:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.421	31	0.427
February	28	0.205	28	0.208
March	31	0.223	31	0.229
April	30	0.19	30	0.189
May	31	0.297	31	0.303
June	30	0.238	30	0.243
July	31	0.334	31	0.338
August	31	0.367	31	0.371
September	30	0.282	30	0.284
October	31	0.347	31	0.353
November	30	0.524	30	0.528
December	31	0.699	31	0.703
TOTAL & AVG	365	0.344	365	0.348

*	No mean sea level value as more than 15 days of data missing
**	No yearly average value as more than one month's MSL missing