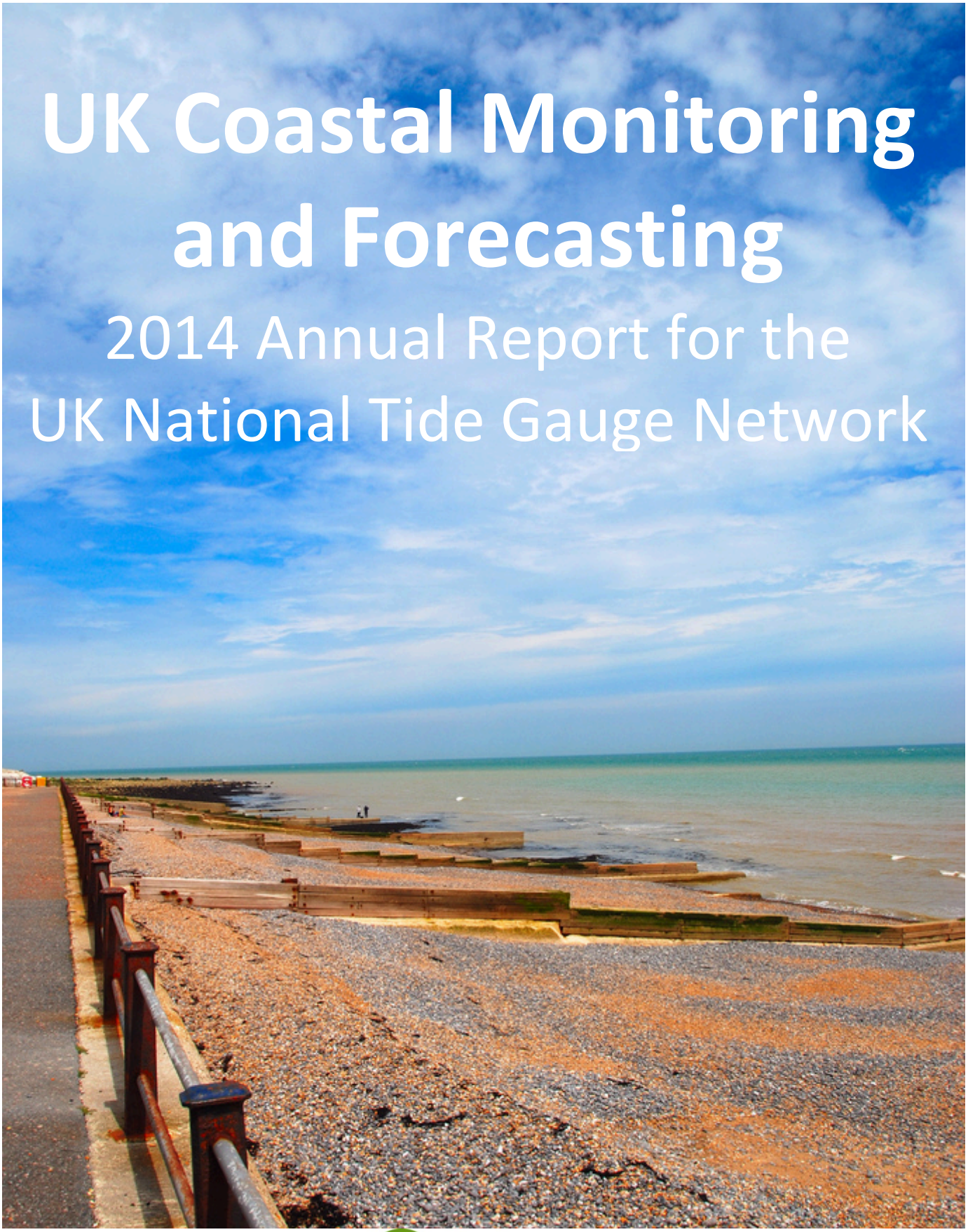
UK Coastal Monitoring and Forecasting

2014 Annual Report for the UK National Tide Gauge Network



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UK Coastal Monitoring and Forecasting: Annual Report for 2014 for the UK National Tide Gauge Network

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

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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/ntslf)

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 2014 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

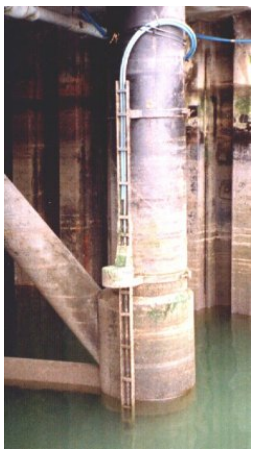
Tide Gauge Instruments

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.

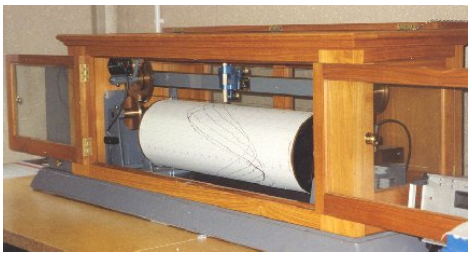


Pressure Transducer

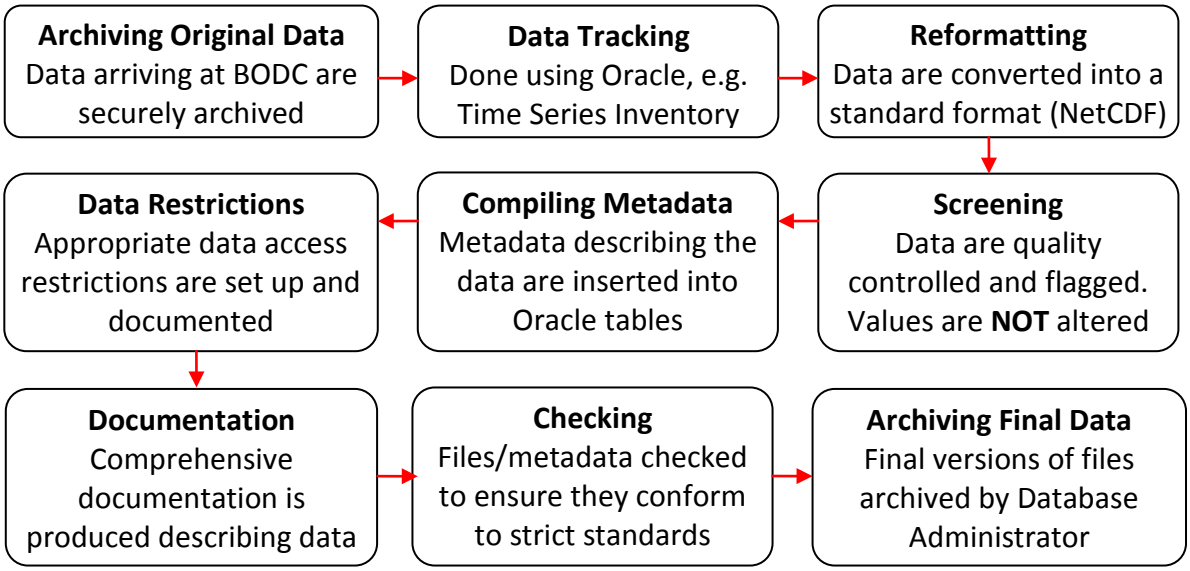
These are differential transducers contained in a watertight housing. The reference port is vented to atmosphere via the power supply and signal cable tube, while the measuring port of the transducer is connected to a copper outlet nozzle on the top of the transducer housing. The nozzle, transducer measuring 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.

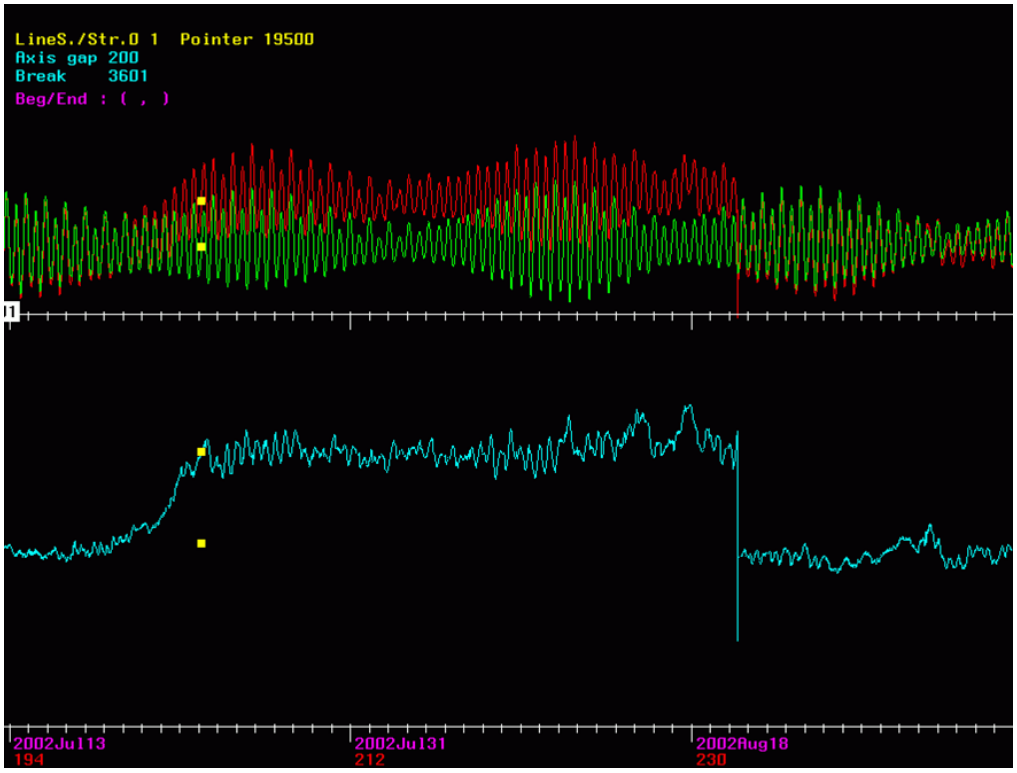
The standard procedure at BODC for the weekly quality control of sea level data includes, where possible:

- 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 bench mark (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 calculated over all sampled data during the month. This excludes any interpolated data but may include rapidly sampled data. Extreme surges (residuals) are calculated in the same way from tidal residuals. Tidal residuals are defined to be the measured water level minus the predicted tide. The predictions derive from the database of tidal constants maintained by NOC's Applications Group (as defined at the time of the calculation) for the ports of the UK and elsewhere.

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 03B 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.

The Permanent Service for Mean Sea Level (PSMSL) recommend refraining from computing a mean sea level value there isn't sufficient data available. Consequently, the monthly statistics given in this report do not 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). Similarly, there is no yearly mean sea level figure 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). For each month, a highlighted cell indicates the best performing channel. 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

Image ©2012 Aerodata International Surveys
Image ©2012 TerraMetrics
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
©2012 Cnes/Spot Image

UK Tide Gauge Data Completeness (%), January to December 2014

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	59.31	100	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	100	100	100	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	99.97	100	100	100	100
Immingham	100	100	100	100	100	99.90	100	100	100	100	100	100
Jersey	100	100	100	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	100	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	99.97	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	100	100	100	100	100	99.93	0	0	0	0	0	0
Newhaven	100	100	100	100	100	100	100	100	100	100	100	100
Newlyn	100	100	100	100	100	100	100	100	100	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	98.61	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	100	100	100	100	100	99.06	100
Stornoway	100	100	100	100	100	100	100	100	100	100	100	100
Tobermory	100	100	100	100	100	100	100	99.97	100	100	100	100
Ullapool	100	100	100	100	100	100	100	99.97	100	87.74	91.39	100
Weymouth	100	100	100	100	99.83	100	100	100	100	100	100	100
Whitby	100	100	100	100	100	100	100	100	100	100	100	79.81
Wick	100	100	100	100	100	100	100	100	100	100	81.46	88.34
Workington	100	100	100	100	100	100	100	100	100	100	100	100

UK Tide Gauge Data Quality (%), January to March 2014

Site	January		February		March	
	Primary	Secondary	Primary	Secondary	Primary	Secondary
Aberdeen	82.16	74.93	100	100	100	100
Avonmouth Portbury	83.74	91.33	99.89	99.89	100	100
Bangor	88.88	0	94.90	0	100	18.68
Barmouth	96.20	96.84	88.91	89.21	93.88	93.88
Bournemouth	0	0	0	0	0	0
Cromer	27.05	100	22.06	100	39.85	100
Dover	12.43	100	7.63	100	13.64	100
Fishguard	100	99.97	100	100	100	100
Harwich	16.30	100	16.82	100	67.84	100
Heysham	93.48	93.45	80.73	78.50	99.83	3.66
Hinkley Point	97.35	0	96.84	0	90.79	0
Holyhead	99.87	99.87	100	40.07	100	64.11
Ilfracombe	95.36	99.97	94.38	99.52	96.88	99.97
Immingham	81.72	30.31	96.39	25.63	100	5.68
Jersey	99.90	99.90	99.74	99.70	99.90	99.90
Kinlochbervie	100	100	88.91	100	100	100
Leith	100	100	99.96	100	100	100
Lerwick	100	100	100	100	99.93	99.93
Liverpool	75.84	5.85	99.78	4.91	98.99	25.27
Llandudno	100	100	100	100	100	100
Lowestoft	100	100	100	100	100	100
Milford Haven	58.87	100	80.92	98.40	98.82	91.77
Millport	100	100	100	100	99.90	99.90
Mumbles	96.61	96.61	92.75	91.74	100	100
Newhaven	100	100	99.26	99.78	100	100
Newlyn	100	100	80.92	74.85	100	87.40
Newport	88.14	15.09	79.69	0	38.78	65.39
North Shields	100	99.29	100	100	100	100
Plymouth Devonport	99.97	99.97	77.64	79.54	100	100
Port Erin	89.48	100	100	100	100	100
Portpatrick	0	84.04	0	100	0	96.81
Portrush	100	80.85	100	96.50	100	83.33
Portsmouth	99.93	99.93	100	100	100	100
Sheerness	0	21.34	0	8.97	0	0
St Marys	9.68	0	40.03	0.45	56.38	22.58
Stornoway	100	100	100	100	100	100
Tobermory	100	100	99.93	99.93	100	100
Ullapool	100	100	100	100	100	100
Weymouth	89.01	99.90	100	100	100	100
Whitby	99.33	99.40	99.29	99.29	98.69	98.69
Wick	84.21	86.76	100	100	100	100
Workington	99.83	99.83	100	96.32	100	96.27

M = No mid-tide, N/A = No output

UK Tide Gauge Data Quality (%), April to June 2014

Site	April		May		June	
	Primary	Secondary	Primary	Secondary	Primary	Secondary
Aberdeen	100	100	100	100	100	100
Avonmouth Portbury	100	100	100	100	99.97	99.97
Bangor	100	44.65	99.97	48.39	99.76	46.56
Barmouth	96.11	96.18	99.29	100	100	100
Bournemouth	0	0	0	0	0	0
Cromer	64.24	100	99.97	99.97	100	100
Dover	0	100	0	80.24	11.25	26.98
Fishguard	94.17	100	99.97	100	100	100
Harwich	100	100	83.57	100	96.53	100
Heysham	100	35.03	78.49	40.93	98.72	0
Hinkley Point	95.87	0	78.49	0	98.72	0
Holyhead	100	100	100	99.97	100	100
Ilfracombe	100	100	100	100	100	100
Immingham	100	0.97	100	1.58	100	0
Jersey	100	100	100	100	100	100
Kinlochbervie	100	100	100	100	100	100
Leith	100	86.49	100	100	100	100
Lerwick	100	100	100	100	100	100
Liverpool	99.97	40.94	100	8.00	100	0
Llandudno	100	100	100	100	100	100
Lowestoft	100	100	100	100	100	100
Milford Haven	100	90.03	100	100	100	100
Millport	100	100	100	100	100	100
Mumbles	96.67	96.67	62.67	62.67	30.44	30.44
Newhaven	100	100	100	100	100	100
Newlyn	100	100	100	100	100	80.76
Newport	0	100	0	100	0	99.76
North Shields	93.40	100	85.45	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	99.90	99.93	67.15	100
Portsmouth	100	100	100	100	100	100
Sheerness	0	0	0	0	0	0
St Marys	99.27	0	63.98	0	63.33	30.35
Stornoway	100	100	100	100	100	100
Tobermory	100	100	100	100	100	100
Ullapool	100	100	100	100	100	100
Weymouth	100	100	100	100	100	100
Whitby	100	100	100	100	99.97	99.97
Wick	96.74	51.39	100	0	100	0
Workington	100	100	100	99.60	100	100

M = No mid-tide, N/A = No output

UK Tide Gauge Data Quality (%), July to September 2014

Site	July		August		September	
	Primary	Secondary	Primary	Secondary	Primary	Secondary
Aberdeen	100	100	100	100	100	100
Avonmouth Portbury	100	100	99.83	99.83	99.31	99.31
Bangor	88.61	35.65	99.63	62.43	96.70	99.51
Barmouth	100	100	91.03	91.03	91.60	91.32
Bournemouth	0	0	0	0	0	0
Cromer	98.59	100	98.86	99.43	67.08	100
Dover	24.97	12.10	0	100	0	100
Fishguard	100	99.97	100	100	100	100
Harwich	68.35	99.33	30.51	100	17.19	100
Heysham	98.59	0	81.96	70.36	87.22	0
Hinkley Point	99.80	0	99.46	0	99.72	0
Holyhead	100	96.37	82.43	99.80	100	100
Ilfracombe	100	100	100	100	100	100
Immingham	100	8.30	85.52	20.19	20.52	26.46
Jersey	100	100	100	100	99.72	99.72
Kinlochbervie	100	100	100	100	100	100
Leith	100	100	100	100	100	100
Lerwick	100	100	100	100	100	100
Liverpool	99.93	0	100	0	99.86	0
Llandudno	100	100	100	100	100	100
Lowestoft	100	100	100	100	100	100
Milford Haven	100	97.78	100	100	100	100
Millport	99.93	99.93	100	100	100	100
Mumbles	0	0	0	0	0	0
Newhaven	100	100	100	100	100	100
Newlyn	91.36	55.81	100	62.80	93.75	56.39
Newport	0	99.19	0	97.51	0	95.94
North Shields	100	100	100	100	100	100
Plymouth Devonport	100	100	99.97	100	100	100
Port Erin	100	100	100	100	100	99.97
Portpatrick	0	100	0	100	0	100
Portrush	27.52	100	83.60	99.97	28.30	100
Portsmouth	100	100	100	100	100	100
Sheerness	0	0	0	0	0	0
St Marys	4.60	100	0	100	11.63	100
Stornoway	100	100	100	100	100	99.58
Tobermory	99.93	99.90	100	100	100	100
Ullapool	100	0.67	100	60.94	90.07	89.79
Weymouth	100	100	100	100	100	100
Whitby	99.56	99.56	99.26	99.26	99.03	99.03
Wick	100	0	59.11	0	99.93	75.28
Workington	100	99.29	100	98.79	100	84.86

M = No mid-tide, N/A = No output

UK Tide Gauge Data Quality (%), October to December 2014

Site	October		November		December	
	Primary	Secondary	Primary	Secondary	Primary	Secondary
Aberdeen	93.35	20.53	100	0	100	0
Avonmouth Portbury	99.43	100	99.17	99.17	98.66	100
Bangor	82.29	65.12	99.31	0	100	17.74
Barmouth	80.07	80.07	84.58	84.58	76.21	76.21
Bournemouth	0	0	0	0	0	0
Cromer	44.59	100	99.20	92.47	95.13	97.68
Dover	0	100	0	100	0	100
Fishguard	100	100	99.97	59.97	100	100
Harwich	89.82	100	96.39	94.65	13.04	0
Heysham	83.64	0	100	0	89.18	0
Hinkley Point	100	0	100	0	99.80	0
Holyhead	68.75	100	100	100	100	100
Ilfracombe	100	100	99.17	100	98.66	100
Immingham	4.74	4.74	28.19	100	0	100
Jersey	100	100	100	100	100	100
Kinlochbervie	95.33	99.93	11.35	100	0	100
Leith	99.97	99.97	100	100	100	100
Lerwick	100	100	100	100	100	100
Liverpool	85.52	35.75	88.96	0	0	56.69
Llandudno	100	100	100	100	100	100
Lowestoft	87.87	100	97.74	100	100	100
Milford Haven	99.40	100	99.97	99.97	100	100
Millport	100	100	100	100	100	100
Mumbles	0	0	0	0	0	0
Newhaven	99.76	99.66	99.97	98.96	100	99.70
Newlyn	100	0	100	0	100	0
Newport	0	97.65	0	99.93	0	100
North Shields	100	100	100	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	0	100	0	100	71.24	100
Portsmouth	100	100	100	100	100	100
Sheerness	0	31.79	0	100	0	100
St Marys	13.17	100	32.77	86.68	72.65	100
Stornoway	100	100	17.78	17.78	1.38	94.79
Tobermory	100	100	100	67.05	100	3.80
Ullapool	90.12	90.16	99.96	99.96	100	100
Weymouth	100	100	100	100	100	100
Whitby	100	100	100	100	99.96	99.96
Wick	99.93	100	99.53	99.53	13.50	87.56
Workington	100	100	99.86	99.76	100	100

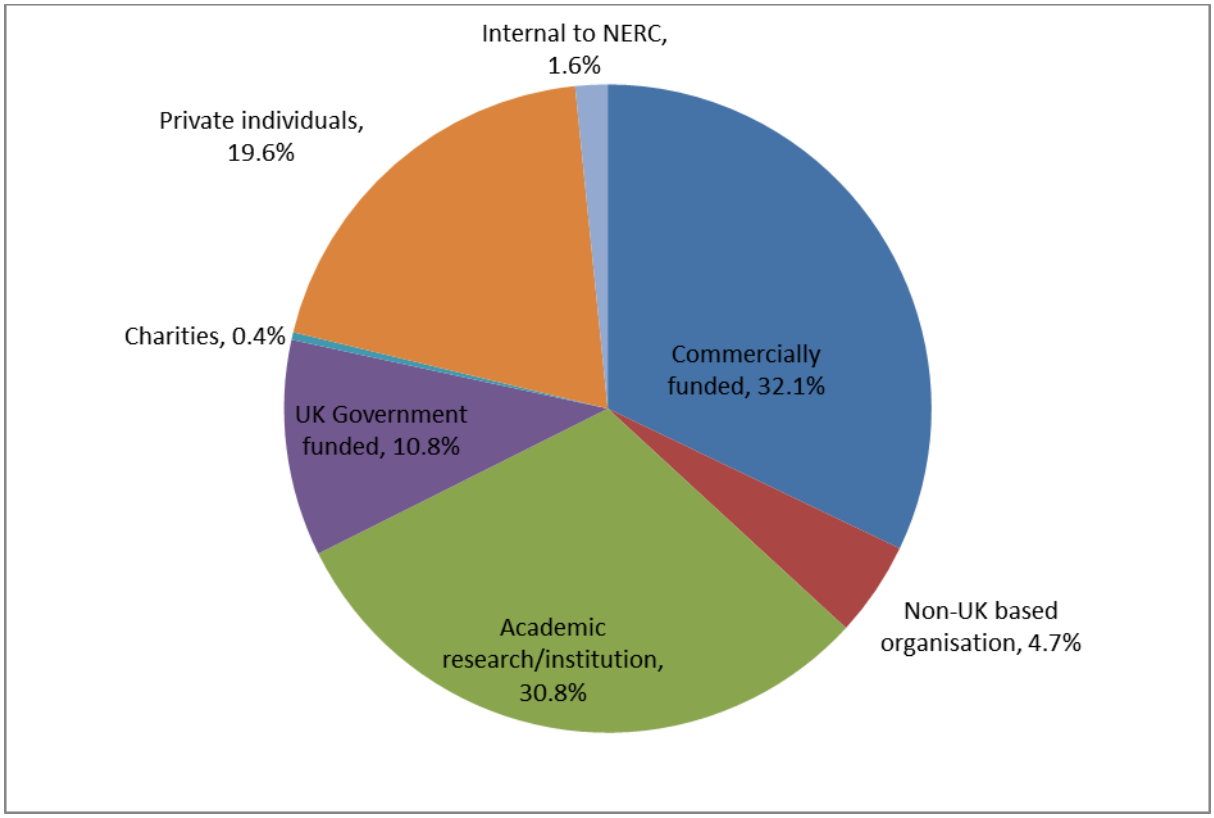
M = No mid-tide, N/A = No output

Requests to BODC for UKCMF Data in 2014, Data Downloads

Site		Heights		Surges		Extremes		Means	
	TOTAL Downloads	No of Downloads	Site Years	No of Downloads	Site Years	No of Downloads	Site Years	No of Downloads	Site Years
Aberdeen	569	420	1193.59	49	354.75	51	309.08	49	269.75
Avonmouth	157	97	290	19	136	22	179	19	91
Avonmouth Portbury	242	215	217.88	10	33.25	10	30.17	7	19.17
Bangor	315	265	374.36	17	35.67	21	67.92	12	19
Barmouth	299	241	304.95	21	100.17	22	143.92	15	107.92
Bournemouth	418	332	442.68	27	96.83	28	122.83	31	128.83
Cromer	396	257	504.29	44	129.16	58	478.58	37	111.83
Dover	349	268	1055.2	29	136.41	38	378.58	14	192
Fishguard	245	213	412.54	9	40.58	13	65.42	10	66.5
Harwich	323	231	411.29	31	83.16	33	92.25	28	80.5
Heysham	390	264	777.2	34	153.25	61	808.66	31	192.91
Hinkley Point	356	253	420.12	34	160.33	38	201.5	31	157.67
Holyhead	279	224	365.62	17	73.33	21	140.25	17	92.42
IOM Port Erin	292	233	287.54	20	70.75	24	114.33	15	67.5
Islay	569	361	1282.37	70	196.08	71	233.99	67	240.33
Ilfracombe	238	212	229.79	9	23.58	10	24.58	7	59.58
Immingham	57	37	232	6	28	8	30	6	27
Jersey	251	219	210.37	10	6.67	11	7.67	11	6.83
Kinlochbervie	221	198	178.29	8	16.33	10	38.33	5	15.08
Leith	332	234	248.45	31	59.83	37	93	30	61.58
Lerwick	264	216	333.45	17	30.92	17	30.92	14	29.67
Liverpool	468	288	453.78	57	232.08	62	345.33	61	254.08
Llandudno	260	210	199.96	17	126.25	18	109.42	15	89.17
Lowestoft	365	253	637.12	37	37.41	34	30.58	41	106.16
Milford Haven	303	224	470.12	20	37.08	37	314.08	22	84.83
Millport	254	212	363.79	18	115.17	14	116	10	89.83
Mumbles	379	245	349.95	43	214.92	50	262.58	41	220.08
Newhaven	313	229	239.79	25	47.75	35	211.25	24	47.75
Newlyn	404	285	1520.62	36	116.17	45	324.41	38	220.17
Newport	300	225	218.29	25	83.33	27	120.25	23	61.58
North Shields	344	245	836.12	30	59.41	37	231.91	32	131
Plymouth Devonport	480	318	510.6	55	311.41	57	409.5	50	329.58
Portpatrick	208	197	313.37	3	9	4	31	4	51
Portrush	269	229	323.28	13	44.5	15	80.67	12	61.25
Portsmouth	354	246	296.53	35	109	42	245.75	31	107.5
Sheerness	322	266	940.45	19	191	20	212	17	174
St Marys	282	224	224.87	20	62.33	22	98.83	16	53.83
Stornoway	240	206	236.87	11	13.58	13	15.58	10	12.5
Tobermory	217	199	172.29	5	10.25	8	58.25	5	34.08
Ullapool	218	196	235.29	6	31.25	9	77.25	7	55.08
Weymouth	290	222	276.96	21	84.33	29	223.5	18	102.5
Whitby	345	240	465.95	35	125.41	36	148.58	34	122.58
Wick	390	301	485.76	29	47.91	30	70.91	30	97.75
Workington	291	216	285.71	26	95.58	29	148.08	20	112.75
TOTALS	**13858**	**10466**	**19829.45**	**1098**	**4170.17**	**1277**	**7476.69**	**1017**	**4656.12**

'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 2014 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

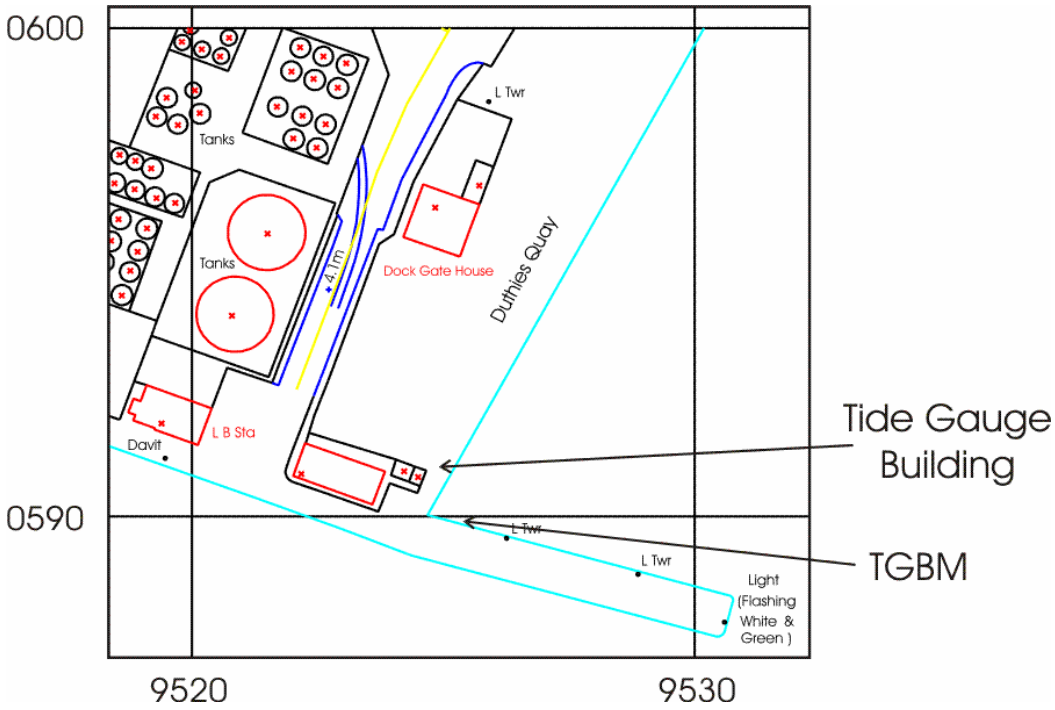
Benchmark Relationships
TGZ = Admiralty Chart Datum (ACD)
TGZ = 2.25m below Ordnance Datum Newlyn (ODN)
TGZ = 6.318m below TGBM

Levelling No levelling was carried out in 2014

Site visits
09/10/2014 (Day 282) 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 2014.

Aberdeen – Map & Images of Site



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	0.486	4	11:00:00	0.498	4	11:00:00	-0.515	24	19:00:00	-0.502	24	19:00:00
Feb	0.489	9	07:00:00	0.499	9	07:00:00	-0.286	20	13:45:00	-0.277	20	13:45:00
Mar	0.574	14	21:00:00	0.583	14	21:00:00	-0.475	8	14:15:00	-0.463	8	14:15:00
Apr	0.455	12	20:30:00	0.461	12	20:30:00	-0.25	15	09:00:00	-0.241	15	09:00:00
May	0.329	6	17:30:00	0.333	6	17:30:00	-0.265	23	18:45:00	-0.26	23	18:45:00
Jun	0.154	19	03:00:00	0.162	19	03:00:00	-0.212	16	21:15:00	-0.206	16	21:15:00
July	0.329	4	20:45:00	0.338	4	20:45:00	-0.185	18	18:15:00	-0.175	18	18:15:00
Aug	0.33	11	20:30:00	0.345	11	20:30:00	-0.174	27	04:00:00	-0.159	27	04:00:00
Sep	0.384	26	11:15:00	0.398	26	11:15:00	-0.244	12	14:15:00	-0.233	12	14:15:00
Oct	0.415	3	17:15:00	0.599	21	17:30:00	-0.127	2	09:30:00	-0.184	22	14:30:00
Nov				0.338	8	06:30:00				-0.163	18	08:00:00
Dec				0.686	10	00:00:00				-0.454	28	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	2.789	4	15:00:00	2.799	4	15:00:00	-2.163	31	19:45:00	-2.15	31	19:45:00
Feb	2.604	2	14:45:00	2.613	2	14:45:00	-1.89	1	20:45:00	-1.875	1	20:45:00
Mar	2.495	3	14:30:00	2.504	3	14:30:00	-2.113	1	19:30:00	-2.102	1	19:30:00
Apr	2.25	1	14:15:00	2.258	1	14:15:00	-1.895	1	20:15:00	-1.885	1	20:15:00
May	2.055	17	02:30:00	2.061	17	02:30:00	-1.811	14	19:00:00	-1.805	14	19:00:00
Jun	2.019	14	01:30:00	2.026	14	01:30:00	-2.037	15	08:30:00	-2.029	15	08:30:00
July	2.383	15	02:45:00	2.394	15	02:45:00	-2.023	14	08:30:00	-2.012	14	08:30:00
Aug	2.606	13	02:30:00	2.621	13	02:30:00	-2.06	13	09:00:00	-2.044	13	09:00:00
Sep	2.494	10	01:30:00	2.511	10	01:30:00	-2.208	11	08:30:00	-2.192	11	08:30:00
Oct	2.338	6	23:15:00	2.622	10	01:45:00	-1.57	7	06:00:00	-1.741	10	08:00:00
Nov				2.531	8	01:30:00				-1.663	6	06:15:00
Dec				2.468	22	13:00:00				-1.914	25	21:30:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	18	0.443	20	0.448
February	28	0.409	28	0.42
March	31	0.252	31	0.261
April	30	0.23	30	0.238
May	31	0.187	31	0.194
June	30	0.204	30	0.211
July	31	0.264	31	0.275
August	31	0.312	31	0.326
September	30	0.285	30	0.302
October	5	0.401	27	0.47
November	0	*	30	0.418
December	0	*	31	0.413
TOTAL & AVG	265	**	350	0.331

*	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

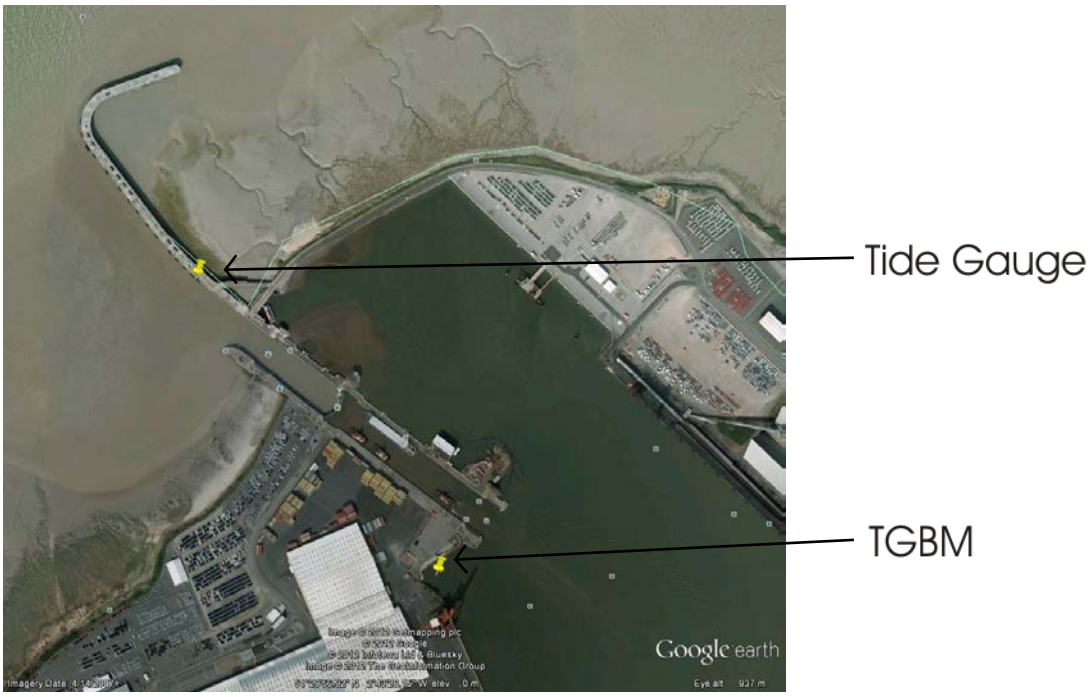
Levelling No levelling was carried out in 2014

Site visits

13/01/2014 (Day 013)	Fault on mains power feed to site. Installation of a battery powered compressor. Fully charged outstation batteries installed.
16/01/2014 (Day 016)	Replacement of a faulty compressor battery.
28/01/2014 (Day 028)	Mains cabling fault repaired. New mains powered compressor installed.
25/02/2014 (Day 056)	Faulty compressor (running constantly). Replaced.
11/06/2014 (Day 162)	Maintenance.
20/08/2014 (Day 232)	Installation of dual GSM unit.

Notes on Data Quality
The power supply was out of commission from 14/12/2013. TGI contacted the port and were informed that the cable feed to the gauge was faulty and would not be rectified until the New Year. A battery powered compressor was installed on 13/01/2014 and on 28/01/2014 power was reinstated to the site.

Avonmouth Portbury – Map & Images of Site



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	0.956	26	13:00:00	0.952	26	13:00:00	-0.71	25	23:15:00	-0.71	25	23:15:00
Feb	2.468	12	14:45:00	2.465	12	14:45:00	-0.729	28	08:15:00	-0.733	28	08:15:00
Mar	0.973	2	06:30:00	0.971	2	06:30:00	-0.699	4	16:45:00	-0.701	4	16:45:00
Apr	0.692	7	18:30:00	0.689	7	18:30:00	-0.514	14	13:30:00	-0.516	14	13:30:00
May	0.898	10	16:30:00	0.895	10	16:30:00	-0.496	15	14:30:00	-0.498	15	14:30:00
Jun	0.52	8	10:15:00	0.517	8	10:15:00	-0.462	17	17:15:00	-0.464	17	17:15:00
July	0.667	16	04:00:00	0.664	16	04:00:00	-0.395	17	05:45:00	-0.397	17	05:45:00
Aug	0.892	14	03:45:00	0.892	14	03:45:00	-0.352	14	07:00:00	-0.35	14	07:00:00
Sep	0.698	11	02:45:00	0.709	11	02:45:00	-0.559	2	08:00:00	-0.553	2	08:00:00
Oct	0.947	21	10:30:00	0.958	21	10:30:00	-0.534	4	22:15:00	-0.524	4	22:15:00
Nov	1.033	14	05:45:00	1.043	14	05:45:00	-0.483	20	16:45:00	-0.479	20	16:45:00
Dec	0.999	12	04:30:00	1.01	12	04:30:00	-0.716	25	19:30:00	-0.708	25	19:30:00

	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	7.769	31	19:45:00	7.79	31	19:45:00	-5.633	31	02:00:00	-5.636	31	02:00:00
Feb	8.402	1	08:15:00	8.395	1	08:15:00	-6.088	2	16:15:00	-6.091	2	16:15:00
Mar	8.395	2	07:45:00	8.389	2	07:45:00	-6.112	1	14:15:00	-6.115	1	14:15:00
Apr	7.769	1	08:15:00	7.762	1	08:15:00	-5.979	1	15:15:00	-5.982	1	15:15:00
May	6.978	1	08:30:00	6.972	1	08:30:00	-5.796	16	02:45:00	-5.799	16	02:45:00
Jun	7.175	14	20:15:00	7.168	14	20:15:00	-5.808	15	03:15:00	-5.81	15	03:15:00
July	7.802	14	20:45:00	7.795	14	20:45:00	-5.826	14	03:15:00	-5.829	14	03:15:00
Aug	8.252	12	20:30:00	8.249	12	20:30:00	-5.92	13	04:00:00	-5.919	13	04:00:00
Sep	8.182	10	20:15:00	8.181	10	20:15:00	-6.077	11	03:30:00	-6.065	11	03:30:00
Oct	8.105	8	19:00:00	8.112	8	19:00:00	-5.586	10	03:00:00	-5.573	10	03:00:00
Nov	7.593	6	18:45:00	7.595	6	18:45:00	-5.272	24	15:00:00	-5.259	24	15:00:00
Dec	7.279	23	08:00:00	7.278	23	08:00:00	-5.53	25	16:30:00	-5.517	25	16:30:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	14	*	14	*
February	28	0.828	28	0.825
March	31	0.52	31	0.516
April	30	0.571	30	0.567
May	31	0.571	31	0.568
June	30	0.522	30	0.519
July	31	0.587	31	0.583
August	31	0.665	31	0.665
September	30	0.605	30	0.611
October	31	0.758	31	0.765
November	30	0.759	30	0.766
December	31	0.604	31	0.612
TOTAL & AVG	348	0.638	348	0.638

*	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

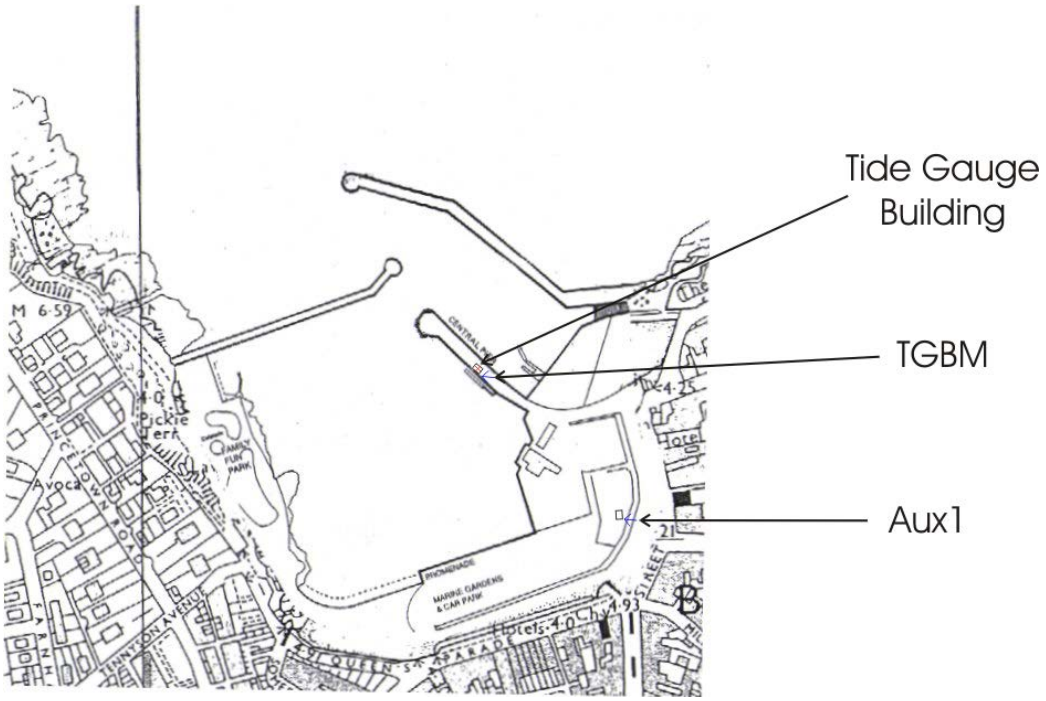
Benchmark Relationships
TGZ = Admiralty Chart Datum (ACD)
TGZ = 2.01m below Ordnance Datum Belfast (ODB)
TGZ = 5.592m below TGBM

Levelling No levelling was carried out in 2014

Site visits
14/05/2014 (Day 134) Maintenance. Compressor change. Clear blocking channel.
12/08/2014 (Day 224) Diving to clear blocking channel.

Notes on Data Quality
In July and August all channels were subject to blocking. TGI dived on site in August and cleared the blocking channel.

Bangor – Map & Images of Site



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				0.917	3	11:45:00				-0.232	26	03:45:00
Feb				1.096	8	14:00:00				-0.311	28	13:00:00
Mar	0.536	20	09:15:00	0.533	20	09:15:00	-0.218	12	00:30:00	-0.376	10	12:00:00
Apr	0.388	6	10:45:00	0.492	6	13:15:00	-0.191	14	19:45:00	-0.217	14	12:15:00
May	0.414	10	16:15:00	0.411	10	16:15:00	-0.267	15	21:15:00	-0.275	23	20:30:00
Jun	0.148	7	19:30:00	0.151	7	19:30:00	-0.272	17	16:15:00	-0.259	17	17:00:00
July	0.34	4	10:15:00	0.334	4	10:15:00	-0.23	9	11:45:00	-0.282	9	10:15:00
Aug	0.377	29	07:30:00	0.374	29	07:30:00	-0.163	18	04:30:00	-0.167	18	04:30:00
Sep	0.139	26	05:15:00	0.101	30	17:30:00	-0.195	1	13:30:00	-0.199	1	13:30:00
Oct	0.78	21	04:00:00	0.753	6	06:45:00	-0.324	21	20:00:00	-0.197	1	23:45:00
Nov	0.413	9	23:00:00	0.591	6	17:45:00	-0.183	13	08:30:00	-0.178	5	10:15:00
Dec	0.536	20	09:15:00	0.552	9	16:45:00	-0.218	12	00:30:00	-0.578	28	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				2.708	3	12:00:00				-1.689	30	16:45:00
Feb				2.345	3	13:15:00				-1.952	28	16:15:00
Mar	1.959	20	13:15:00	1.988	2	11:45:00	-1.794	28	15:15:00	-1.834	1	17:00:00
Apr	1.545	3	01:15:00	1.622	1	12:15:00	-1.727	27	15:45:00	-1.734	27	15:45:00
May	1.58	18	01:00:00	1.584	18	01:15:00	-1.696	16	05:45:00	-1.724	17	06:15:00
Jun	1.513	27	23:15:00	1.52	27	23:30:00	-1.853	17	08:00:00	-1.88	16	07:00:00
July	1.748	15	00:30:00	1.746	15	00:30:00	-1.85	15	07:00:00	-1.863	15	06:45:00
Aug	1.833	13	00:15:00	1.828	13	00:15:00	-1.747	13	06:30:00	-1.751	13	06:30:00
Sep	1.719	11	00:00:00	1.714	11	00:00:00	-1.83	10	05:15:00	-1.834	10	05:15:00
Oct	2.071	8	22:45:00	2.068	8	22:45:00	-1.496	7	03:45:00	-1.498	7	03:45:00
Nov	1.694	10	14:00:00	2.13	6	22:45:00	-1.176	11	20:15:00	-1.579	5	03:00:00
Dec	1.959	20	13:15:00	1.915	9	13:00:00	-1.794	28	15:15:00	-1.776	27	21:00:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	0	*	16	0.297
February	0	*	22	0.271
March	0	*	31	-0.006
April	2	*	30	0.017
May	0	*	31	-0.03
June	1	*	30	-0.048
July	0	*	23	0.009
August	1	*	31	0.054
September	18	0.031	26	0.011
October	30	0.023	21	0.212
November	18	0.222	29	0.235
December	4	*	31	0.077
TOTAL & AVG	74	**	321	0.092

*	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

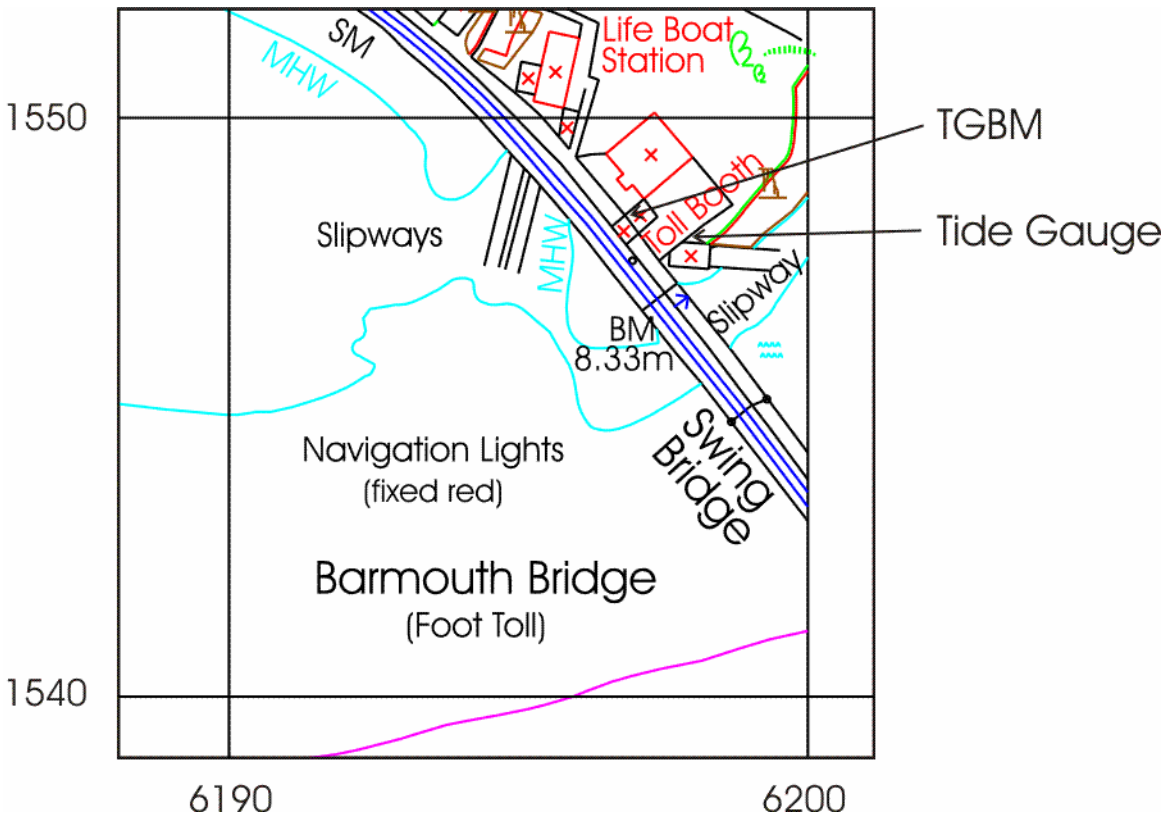
Benchmark Relationships
TGZ = Admiralty Chart Datum (ACD)
TGZ = 2.44m below ODN
TGZ = 10.363m below TGBM

Levelling No levelling was carried out in 2014

Site visits
12/11/2014 (Day 316) Maintenance. Compressor change.

Notes on Data Quality
In March, the full tide channels were low and lagging on some falling tides, particularly spring tides.

Barmouth – Map & Images of Site



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	1.094	3	19:00:00	1.094	3	19:00:00	-0.44	26	00:30:00	-0.439	26	00:30:00
Feb	2.533	12	15:30:00	2.533	12	15:30:00	-0.53	28	09:15:00	-0.555	28	09:15:00
Mar	0.752	20	12:30:00	0.745	20	12:30:00	-0.38	16	11:30:00	-0.385	16	11:30:00
Apr	0.498	6	10:45:00	0.505	6	10:45:00	-0.3	14	11:45:00	-0.305	14	11:45:00
May	0.692	10	14:45:00	0.698	10	14:45:00	-0.3	15	23:45:00	-0.307	15	23:45:00
Jun	0.192	28	00:15:00	0.195	7	08:15:00	-0.264	17	14:00:00	-0.268	17	14:30:00
July	0.322	4	13:00:00	0.327	4	13:00:00	-0.297	9	06:15:00	-0.293	9	06:15:00
Aug	0.378	13	05:00:00	0.382	13	05:00:00	-0.193	26	16:00:00	-0.188	26	16:00:00
Sep	0.276	10	04:00:00	0.274	10	04:00:00	-0.267	2	06:30:00	-0.261	2	06:30:00
Oct	0.907	21	03:45:00	0.911	21	03:45:00	-0.355	21	18:30:00	-0.351	21	18:30:00
Nov	0.94	13	15:45:00	0.946	13	15:45:00	-0.232	17	17:45:00	-0.226	17	17:45:00
Dec	0.486	9	17:45:00	0.49	9	17:00:00	-0.558	28	01:30:00	-0.557	28	01:30:00

	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	3.924	3	09:15:00	3.92	3	09:15:00	-1.674	30	15:30:00	-1.672	30	15:30:00
Feb	3.686	3	10:30:00	3.687	3	10:30:00	-1.686	28	14:45:00	-1.701	28	15:15:00
Mar	3.542	2	08:45:00	3.547	2	08:45:00	-1.687	1	03:15:00	-1.702	28	13:45:00
Apr	3.034	1	09:15:00	3.04	1	09:15:00	-1.688	2	05:00:00	-1.702	2	05:00:00
May	2.636	1	09:30:00	2.643	1	09:30:00	-1.687	2	05:15:00	-1.701	15	03:30:00
Jun	2.712	15	22:00:00	2.718	15	22:00:00	-1.686	12	14:45:00	-1.701	15	05:00:00
July	3.237	14	21:45:00	3.243	14	21:45:00	-1.686	12	02:45:00	-1.701	13	04:00:00
Aug	3.432	12	21:30:00	3.438	12	21:30:00	-1.686	13	05:45:00	-1.7	13	17:30:00
Sep	3.304	10	21:15:00	3.311	10	21:15:00	-1.687	11	05:00:00	-1.701	8	02:30:00
Oct	3.524	8	20:00:00	3.528	8	20:00:00	-1.59	11	17:30:00	-1.586	11	17:30:00
Nov	3.132	7	20:15:00	3.134	7	20:15:00	-1.54	24	16:45:00	-1.535	24	16:45:00
Dec	3.052	23	08:45:00	3.055	23	08:45:00	-1.681	25	18:15:00	-1.678	25	18:15:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	26	0.52	26	0.52
February	24	0.635	24	0.636
March	26	0.212	26	0.215
April	28	0.248	28	0.25
May	31	0.226	31	0.229
June	30	0.193	30	0.197
July	31	0.235	31	0.239
August	23	0.297	23	0.3
September	23	0.247	23	0.249
October	13	*	13	*
November	14	*	14	*
December	10	*	10	*
TOTAL & AVG	279	**	279	**

*	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

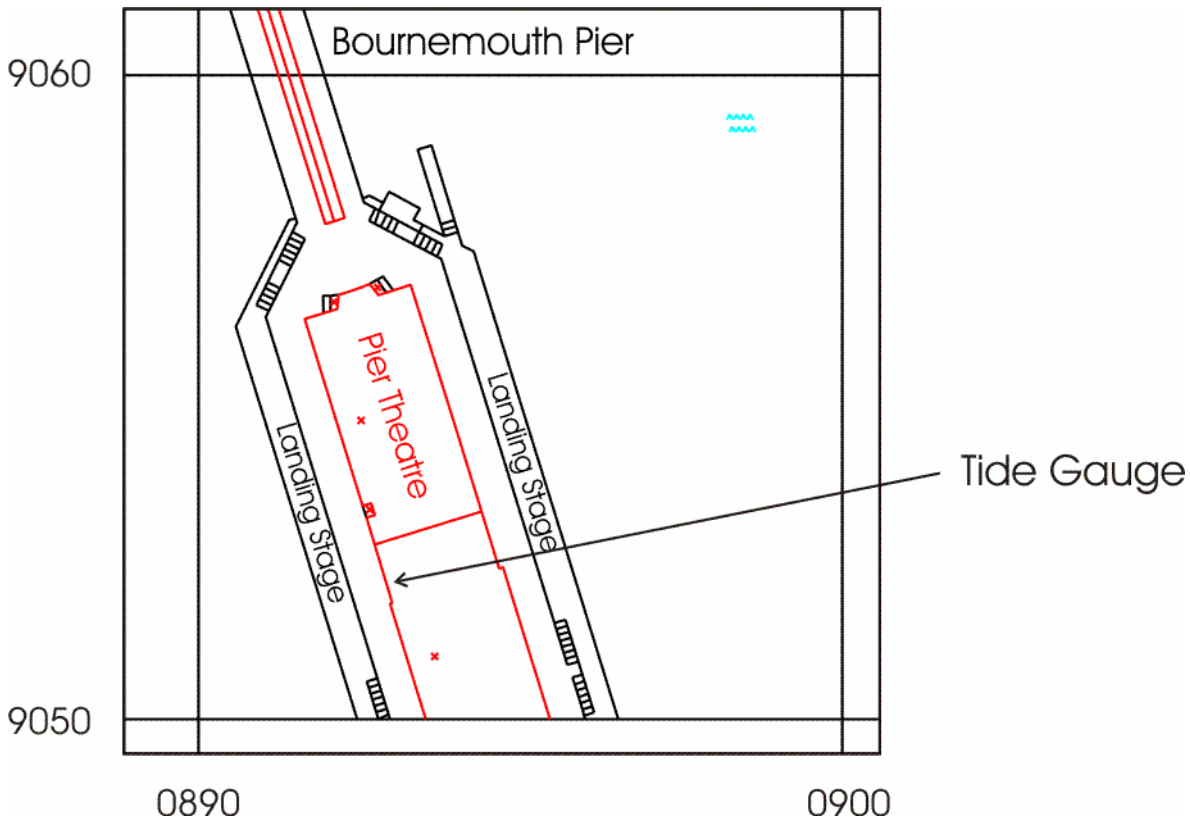
Levelling No levelling was carried out in 2014

Site visits

02/04/2014 (Day 092)	Maintenance. Diving survey on missing steelwork. Diving cancelled due to zero visibility.
28/07/2014 (Day 209)	Levelling and establishing a BM on the pier. Installing the radar mounting plate and removing obstructing steelwork. Compressor removed.
03/09/2014 (Day 246)	Installation of Vega radar gauge.
05/11/2014 (Day 309)	Investigation of radar constant readings. Radar OK but contractors working under the pier near the gauge setting up scaffolding. Possible problems until Jan 15.

Notes on Data Quality
The steelwork at Bournemouth was damaged in a storm on 29/10/2013. TGI confirmed that the lower steelwork section was missing. A Vega radar gauge was installed by TGI as part of resilience improvement work. Data from the radar gauge is not being quality controlled by BODC. There have been issues with the radar gauge data possibly caused by contractors working under the pier. The refurbishment of the bubbler gauge is on hold as a dive is required to survey the damage and measure for new steelwork.

Bournemouth – Map & Images of Site



Bournemouth – Statistics

Neither the Primary nor Secondary channel were operational during 2014, 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 For most of the year, the data acquisition system was two full-tide and a mid-tide bubbler gauge
From November 24th, the system was an 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

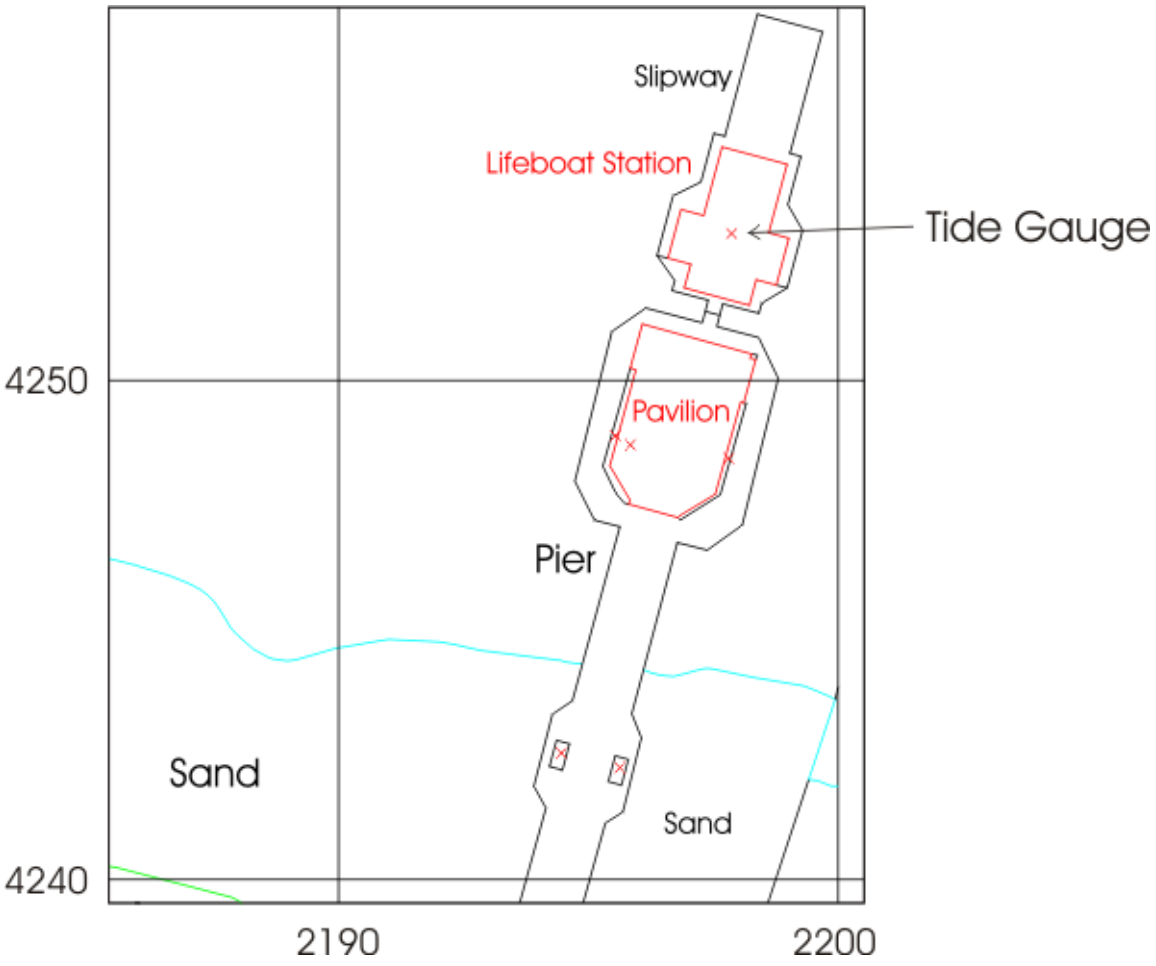
Levelling No levelling was carried out in 2014

Site visits

01/05/2014 (Day 121)	Maintenance.
12/08/2014 (Day 224)	Installation of the underwater DQ. Unable to complete installation due to boat engine fault and weather conditions.
22/08/2014 (Day 234)	Visit to investigate the fault with the underwater DQ.
24/11/2014 (Day 328)	Installation of the underwater DQ transducer.

Notes on Data Quality
The site met the agreed target of being operational for at least 75% of each calendar month in 2014.
An underwater DQ transducer was installed in November as prior to this, Channel 2 appeared to lose pressure in stormy conditions.

Cromer – Map & Images of Site



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	0.582	25	22:00:00	0.555	4	17:45:00	-1.049	25	00:30:00	-0.806	3	16:45:00
Feb	0.483	21	07:15:00	0.483	28	02:30:00	-0.957	13	01:30:00	-0.601	5	18:00:00
Mar	1.3	15	02:30:00	0.458	9	14:45:00	-0.896	8	20:15:00	-0.707	8	14:45:00
Apr	0.667	18	03:15:00	0.675	18	03:15:00	-0.39	15	16:15:00	-0.381	15	16:15:00
May	0.33	6	21:30:00	0.339	6	23:00:00	-0.27	15	03:15:00	-0.267	15	03:15:00
Jun	0.36	19	09:00:00	0.375	19	09:00:00	-0.199	23	00:30:00	-0.179	23	00:30:00
July	0.451	9	10:45:00	0.463	9	10:45:00	-0.293	16	18:45:00	-0.277	16	18:45:00
Aug	0.382	18	07:15:00	0.407	18	07:15:00	-0.351	3	19:30:00	-0.331	3	19:30:00
Sep	0.695	26	16:15:00	0.244	24	20:15:00	-0.257	12	18:00:00	-0.245	11	17:15:00
Oct	1.752	22	00:15:00	0.741	21	14:00:00	-0.655	6	13:45:00	-0.473	18	11:15:00
Nov	0.37	15	16:45:00	0.379	15	16:45:00	-0.662	7	03:00:00	-0.648	7	03:00:00
Dec	1.343	10	05:30:00	1.341	10	05:30:00	-1.462	9	18:00:00	-1.452	9	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	3.008	4	20:30:00	3.019	4	20:30:00	-2.611	6	04:30:00	-2.597	6	04:30:00
Feb	2.78	2	20:15:00	2.269	3	08:45:00	-3.11	1	02:00:00	-2.261	3	03:15:00
Mar	2.714	3	19:45:00	2.743	3	20:00:00	-2.609	3	02:30:00	-2.597	3	02:30:00
Apr	2.683	17	19:45:00	2.702	17	19:45:00	-2.266	16	01:30:00	-2.259	16	01:30:00
May	2.346	17	07:45:00	2.358	17	07:45:00	-2.155	15	01:00:00	-2.15	15	01:00:00
Jun	2.5	16	08:30:00	2.513	16	08:30:00	-2.144	15	14:45:00	-2.133	15	14:45:00
July	2.72	15	08:15:00	2.74	15	08:15:00	-2.354	16	16:15:00	-2.341	16	16:15:00
Aug	2.874	13	08:00:00	2.893	13	08:00:00	-2.379	12	14:15:00	-2.359	12	14:15:00
Sep	2.86	10	07:00:00	2.87	10	07:00:00	-2.346	10	14:00:00	-2.333	10	14:00:00
Oct	2.871	10	07:15:00	2.5	27	08:15:00	-2.241	9	13:45:00	-1.882	25	13:45:00
Nov	2.578	8	07:00:00	2.592	8	07:00:00	-2.332	7	01:00:00	-2.316	7	01:00:00
Dec	2.574	20	17:00:00	2.621	8	19:15:00	-2.205	9	15:00:00	-2.195	9	15:00:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.096	7	*
February	28	0.085	2	*
March	31	0.142	3	*
April	30	0.187	14	*
May	31	0.151	31	0.162
June	30	0.188	30	0.204
July	31	0.244	29	0.246
August	30	0.25	28	0.266
September	30	0.274	17	0.244
October	31	0.314	12	*
November	25	0.243	28	0.266
December	27	0.308	22	0.324
TOTAL & AVG	355	0.207	223	**

*	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

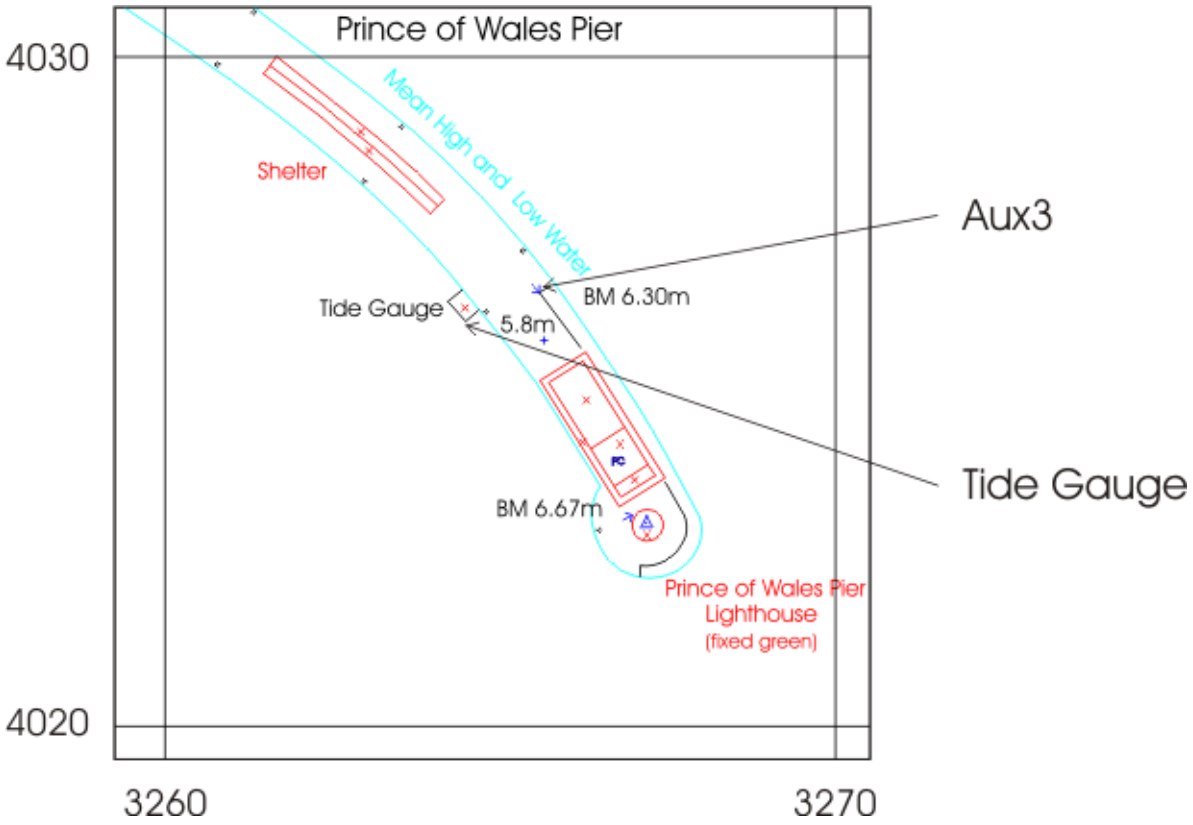
Levelling No levelling was carried out in 2014

Site visits

29/07/2014 (Day 210)	Maintenance. Diving to clear blocked channel. Pressure points unusable, pneumatic lines terminated.
15/12/2014 (Day 349)	Compressor change.

Notes on Data Quality
The primary channel was up to ~100mm high in places due to blocking, which was acceptable for monitoring extremes but was flagged as unacceptable for the purposes of long-term sea level monitoring. The backup channel was available throughout.

Dover – Map & Images of Site



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	0.795	26	03:00:00	0.592	4	22:15:00	-0.872	25	04:30:00	-0.261	13	08:15:00
Feb	0.679	28	08:00:00	0.68	28	08:00:00	-1.044	15	10:15:00	-0.35	20	13:45:00
Mar	0.675	15	10:15:00	0.33	3	21:15:00	-0.556	8	23:00:00	-0.56	8	22:15:00
Apr	0.474	18	01:00:00				-0.391	15	21:00:00			
May	0.431	11	18:30:00				-0.312	15	08:45:00			
Jun	0.285	19	15:30:00	0.312	29	05:00:00	-0.137	20	14:15:00	-0.162	18	12:30:00
July	0.471	9	16:30:00	0.498	9	16:00:00	-0.081	29	10:00:00	-0.162	16	14:45:00
Aug	0.351	10	20:15:00				-0.291	4	03:00:00			
Sep	0.374	27	00:45:00				-0.357	12	10:45:00			
Oct	1.271	22	02:15:00				-0.491	6	21:15:00			
Nov	0.422	4	07:00:00				-0.59	7	10:30:00			
Dec	0.988	10	10:30:00				-1.42	10	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	3.713	5	01:15:00	3.704	5	01:15:00	-3.145	4	08:00:00	-2.14	14	17:00:00
Feb	3.553	3	01:00:00	3.302	28	09:45:00	-3.55	1	07:00:00	-2.693	19	08:45:00
Mar	3.503	4	00:30:00	3.498	4	00:30:00	-3.317	3	07:30:00	-2.722	17	18:45:00
Apr	3.441	18	00:30:00				-3.155	1	07:15:00			
May	3.128	1	00:00:00				-3.04	16	19:30:00			
Jun	2.966	19	15:45:00	2.954	18	14:45:00	-2.663	18	22:30:00	-2.592	18	09:45:00
July	2.921	30	13:00:00	3.224	13	11:15:00	-2.56	29	19:45:00	-3.065	16	21:15:00
Aug	3.632	13	12:45:00				-3.205	12	19:30:00			
Sep	3.576	11	12:15:00				-3.274	10	19:30:00			
Oct	3.585	10	11:45:00				-3.098	9	19:00:00			
Nov	3.329	8	11:30:00				-3.112	7	18:30:00			
Dec	3.3	25	13:00:00				-2.973	26	09:15:00			

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.119	0	*
February	28	0.097	0	*
March	31	0.049	0	*
April	30	0.098	0	*
May	17	0.084	0	*
June	4	*	0	*
July	2	*	0	*
August	31	0.163	0	*
September	30	0.155	0	*
October	31	0.217	0	*
November	30	0.195	0	*
December	31	0.172	0	*
TOTAL & AVG		**	**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

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

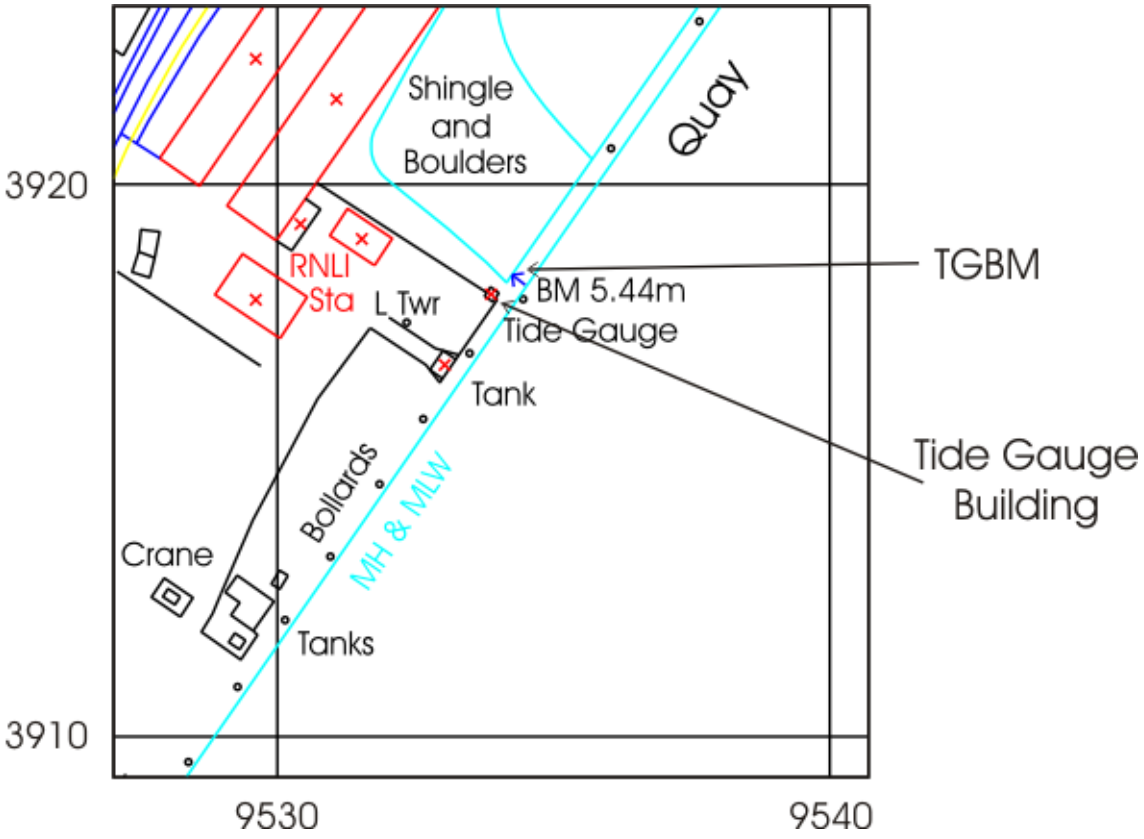
Benchmark Relationships
TGZ = Admiralty Chart Datum (ACD)
TGZ = 2.44m below ODN
TGZ = 7.88m below TGBM

Levelling No levelling was carried out in 2014

Site visits
06/11/2014 (Day 310) 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 2014.

Fishguard – Map & Images of Site



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	0.752	3	14:45:00	0.752	3	14:45:00	-0.316	25	22:45:00	-0.316	25	22:45:00
Feb	1.405	12	14:00:00	1.403	12	14:00:00	-0.337	28	08:45:00	-0.336	28	08:45:00
Mar	0.484	2	15:00:00	0.486	2	15:00:00	-0.221	10	16:15:00	-0.222	25	18:00:00
Apr	0.45	25	23:45:00	0.47	26	00:15:00	-0.159	14	10:30:00	-0.078	13	03:00:00
May	0.385	10	10:15:00	0.385	10	10:15:00	-0.211	15	13:30:00	-0.203	15	13:30:00
Jun	0.229	27	17:30:00	0.25	27	17:30:00	-0.162	15	11:15:00	-0.151	15	11:15:00
July	0.293	4	11:45:00	0.305	4	12:15:00	-0.147	9	10:30:00	-0.135	9	10:30:00
Aug	0.299	10	02:00:00	0.32	10	02:00:00	-0.079	15	21:45:00	-0.05	15	21:45:00
Sep	0.213	17	21:15:00	0.233	17	21:15:00	-0.143	2	06:15:00	-0.133	2	06:15:00
Oct	0.579	21	03:45:00	0.577	21	03:45:00	-0.302	21	22:15:00	-0.292	21	16:45:00
Nov	0.393	6	14:15:00	0.635	14	03:15:00	-0.072	23	06:45:00	-0.086	23	06:45:00
Dec	0.421	12	00:30:00	0.402	12	00:30:00	-0.349	27	01:30:00	-0.373	27	01:30:00

	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	3.368	3	08:00:00	3.365	3	08:00:00	-1.635	30	13:15:00	-1.638	30	13:15:00
Feb	3.362	3	09:30:00	3.362	3	09:30:00	-2.066	28	13:00:00	-2.063	28	13:00:00
Mar	3.229	2	07:45:00	3.227	2	07:45:00	-2.064	3	15:15:00	-2.067	3	15:15:00
Apr	2.783	1	08:15:00	2.783	2	08:45:00	-1.816	1	02:30:00	-1.815	1	02:30:00
May	2.431	1	08:30:00	2.442	1	08:30:00	-1.827	17	03:15:00	-1.82	16	02:15:00
Jun	2.48	15	21:00:00	2.492	15	21:00:00	-1.866	16	03:45:00	-1.85	16	03:45:00
July	2.902	14	20:45:00	2.924	14	20:45:00	-1.986	15	03:30:00	-1.964	15	03:30:00
Aug	3.087	12	20:30:00	3.1	12	20:30:00	-2.008	13	03:15:00	-1.991	13	03:15:00
Sep	3.023	10	20:00:00	3.044	10	20:15:00	-2.059	10	02:00:00	-2.049	10	02:00:00
Oct	3.198	8	19:00:00	3.209	8	19:00:00	-1.688	10	02:30:00	-1.68	10	02:30:00
Nov	2.672	6	06:15:00	3.084	6	18:45:00	-1.469	24	14:45:00	-1.491	24	14:45:00
Dec	2.678	23	07:45:00	2.648	23	07:45:00	-1.761	25	16:00:00	-1.773	25	16:00:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.516	31	0.517
February	28	0.548	28	0.546
March	31	0.262	31	0.262
April	30	0.319	26	0.342
May	31	0.279	31	0.289
June	30	0.269	30	0.284
July	31	0.298	31	0.319
August	31	0.343	31	0.359
September	30	0.326	30	0.34
October	31	0.466	31	0.475
November	16	0.48	30	0.541
December	31	0.31	31	0.293
TOTAL & AVG	351	0.368	361	0.381

*	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

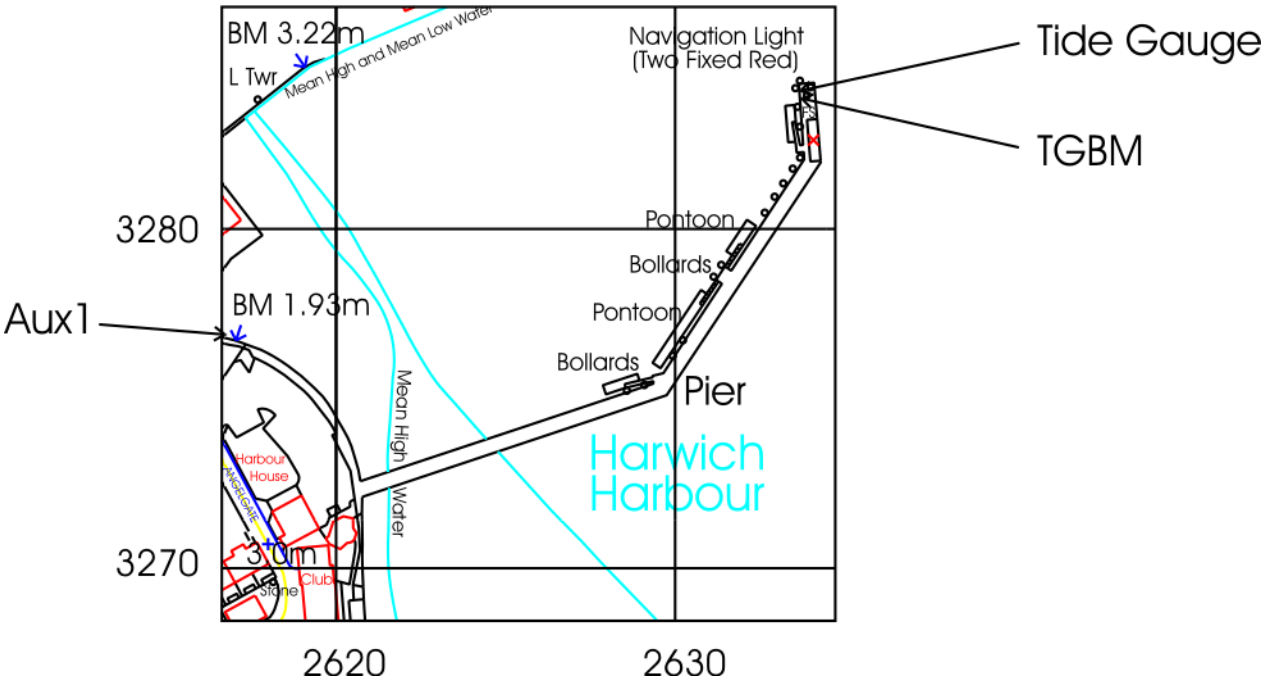
Benchmark Relationships
TGZ = Admiralty Chart Datum (ACD)
TGZ = 2.02m below ODN
TGZ = 6.17m below TGBM

Levelling No levelling was carried out in 2014

Site visits
No site visits were carried out in 2014

Notes on Data Quality
Towards the end of the year Channel 2 was blocking and Channel 1 was reading 150-200mm high due to restricted flow.

Harwich – Map & Images of Site



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	0.945	26	01:45:00	0.63	5	00:00:00	-1.145	25	06:30:00	-0.778	4	02:15:00
Feb	0.637	15	23:30:00	0.589	28	08:45:00	-1.092	1	01:30:00	-0.708	27	11:15:00
Mar	1.176	15	06:15:00	1.185	15	06:15:00	-0.68	8	18:30:00	-0.674	8	18:30:00
Apr	0.627	18	03:45:00	0.631	18	03:45:00	-0.276	16	07:00:00	-0.273	16	06:45:00
May	0.404	9	19:45:00	0.405	9	19:45:00	-0.248	10	16:15:00	-0.244	10	16:15:00
Jun	0.457	19	12:00:00	0.484	19	12:00:00	-0.195	3	01:00:00	-0.193	3	00:45:00
July	0.543	9	15:30:00	0.549	9	15:30:00	-0.248	17	02:00:00	-0.241	17	02:00:00
Aug	0.504	18	13:00:00	0.38	10	06:15:00	-0.344	11	00:30:00	-0.333	11	00:30:00
Sep	0.59	26	20:15:00	0.608	26	20:15:00	-0.3	13	01:15:00	-0.193	30	16:30:00
Oct	1.55	22	03:45:00	1.55	22	03:45:00	-0.683	21	11:15:00	-0.68	21	11:15:00
Nov	0.424	15	17:15:00	0.43	15	17:15:00	-0.758	7	12:45:00	-0.755	7	12:45:00
Dec				0.671	2	15:45:00				-0.168	3	20:30:00

	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	2.576	4	13:30:00	2.584	4	13:30:00	-2.126	6	09:00:00	-1.985	3	19:00:00
Feb	2.508	28	10:45:00	2.51	28	10:45:00	-2.587	1	06:30:00	-1.66	27	15:30:00
Mar	2.423	3	13:00:00	2.424	3	13:00:00	-2.044	3	06:30:00	-2.041	3	06:30:00
Apr	2.402	18	01:15:00	2.405	18	01:15:00	-1.88	16	06:00:00	-1.877	16	06:00:00
May	2.166	1	00:45:00	2.167	1	00:45:00	-1.793	15	05:30:00	-1.789	15	05:30:00
Jun	2.218	17	02:30:00	2.225	17	02:30:00	-1.757	17	20:45:00	-1.75	17	20:45:00
July	2.363	14	00:30:00	2.37	14	00:30:00	-1.92	16	20:45:00	-1.914	16	20:45:00
Aug	2.408	14	14:00:00	2.405	14	01:45:00	-1.915	11	18:00:00	-1.906	11	18:00:00
Sep	2.381	10	00:00:00	2.334	27	01:00:00	-1.854	10	18:30:00	-1.535	25	18:00:00
Oct	2.851	21	22:30:00	2.852	21	22:30:00	-1.817	9	18:00:00	-1.815	9	18:00:00
Nov	2.403	8	12:00:00	2.409	8	12:15:00	-1.979	7	17:30:00	-1.975	7	17:30:00
Dec				1.981	2	20:30:00				-1.396	4	15:45:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.081	4	*
February	28	0.067	4	*
March	31	0.106	17	0.077
April	30	0.155	30	0.158
May	31	0.11	22	0.121
June	30	0.149	28	0.143
July	28	0.206	15	*
August	31	0.209	5	*
September	30	0.234	2	*
October	31	0.265	26	0.285
November	27	0.231	27	0.217
December	0	*	3	*
TOTAL & AVG	328	0.165	183	**

*	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

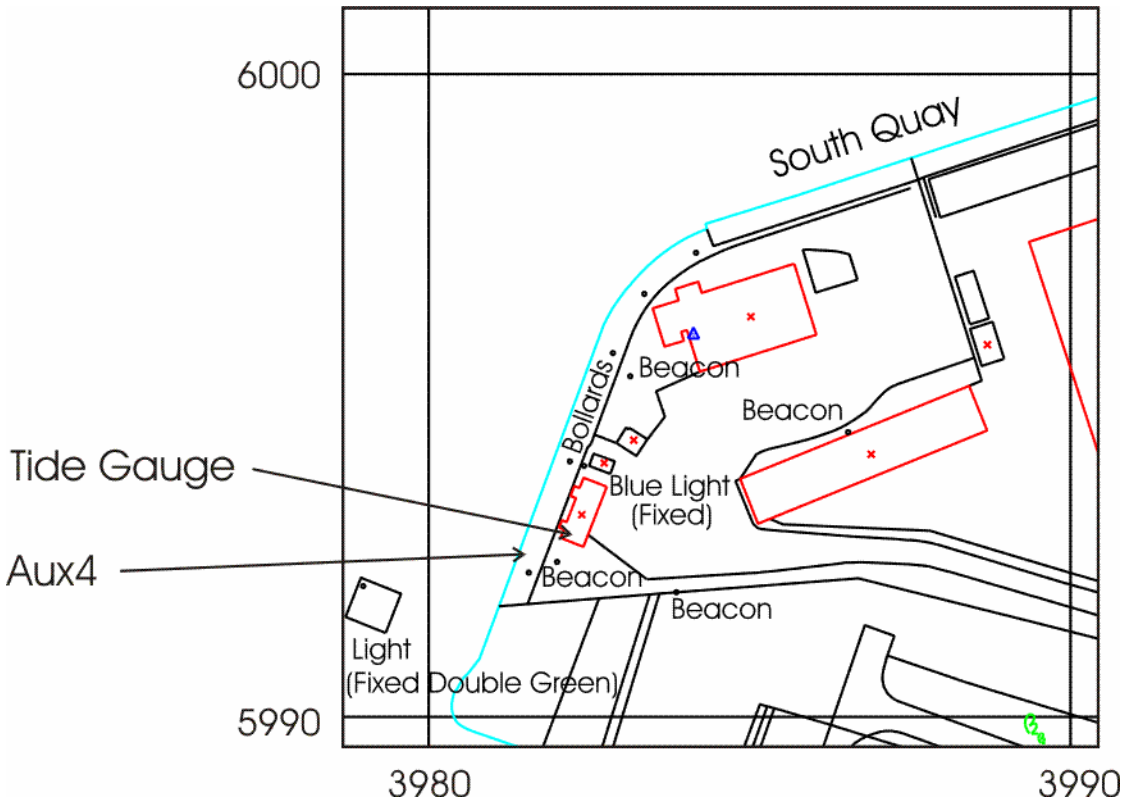
Levelling No levelling was carried out in 2014

Site visits

13/05/2014 (Day 133)	Meeting with electrical inspectors at site.
10/07/2014 (Day 191)	Inst of 12v compressor for testing.
10/10/2014 (Day 283)	Channel 2 falling away during high waters. The flow rate metering was incorrect. Adjusted on all channels - All OK. Checks carried out on the 12v compressor that was installed for evaluation.
18/12/2014 (Day 352)	12v compressor that has been undergoing testing changed for 240v compressor

Notes on Data Quality
Channel 1 was flagged in March, June to July and September to December as it was ~30mm, probably due to dredging in the harbour. This was acceptable for monitoring extremes but was flagged as unacceptable for the purposes of long-term sea level monitoring. In December, data from Channel 2 was flagged as unreliable. On investigation, the flow rate was found to be incorrect.

Heysham – Map & Images of Site



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	1.287	26	14:45:00	1.298	26	14:45:00	-0.463	26	02:00:00	-0.455	26	02:00:00
Feb	2.661	12	17:45:00	2.67	12	17:45:00	-0.569	28	13:00:00	-0.555	28	13:00:00
Mar	0.7	2	22:30:00	0.75	20	14:45:00	-0.243	1	07:15:00	-0.454	25	20:30:00
Apr	0.335	26	17:00:00	0.624	6	13:30:00	-0.377	20	22:45:00	-0.344	20	22:45:00
May	0.611	10	18:00:00	0.635	10	18:00:00	-0.261	2	10:00:00	-0.315	15	17:45:00
Jun				0.272	10	18:30:00				-0.312	17	17:15:00
July				0.395	4	14:00:00				-0.224	17	17:30:00
Aug	0.474	29	09:30:00	0.604	10	18:30:00	-0.242	26	08:15:00	-0.244	26	07:45:00
Sep				0.225	26	06:45:00				-0.258	2	11:00:00
Oct				1.406	21	06:00:00				-0.325	21	19:45:00
Nov				0.696	13	18:45:00				-0.276	17	15:45:00
Dec				0.813	9	20:15:00				-0.621	28	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	6.274	3	12:15:00	6.284	3	12:15:00	-4.115	30	17:30:00	-4.108	30	17:30:00
Feb	5.906	3	13:30:00	5.91	3	13:30:00	-4.42	2	19:45:00	-4.418	2	19:45:00
Mar	5.727	3	00:00:00	5.925	2	11:45:00	-4.239	1	05:30:00	-4.606	3	19:30:00
Apr	4.991	30	11:45:00	5.395	1	12:00:00	-3.979	27	16:30:00	-4.231	1	19:00:00
May	4.83	1	00:00:00	4.875	18	01:15:00	-3.829	2	07:30:00	-4.043	16	06:30:00
Jun				5.004	15	00:15:00				-4.264	16	07:45:00
July				5.527	15	00:45:00				-4.403	15	07:45:00
Aug	5.894	13	00:30:00	5.675	12	00:00:00	-4.327	13	07:30:00	-4.334	13	07:30:00
Sep				5.766	11	00:00:00				-4.559	10	06:15:00
Oct				5.469	11	00:30:00				-3.909	11	07:15:00
Nov				5.528	6	22:45:00				-3.675	6	04:45:00
Dec				5.315	23	11:45:00				-4.048	25	20:00:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	25	0.533	25	0.539
February	15	0.49	17	0.515
March	0	*	31	0.236
April	10	*	30	0.254
May	11	*	21	0.242
June	0	*	30	0.209
July	0	*	30	0.268
August	18	0.296	20	0.31
September	0	*	21	0.267
October	0	*	24	0.485
November	0	*	30	0.454
December	0	*	18	0.399
TOTAL & AVG	79	**	297	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

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

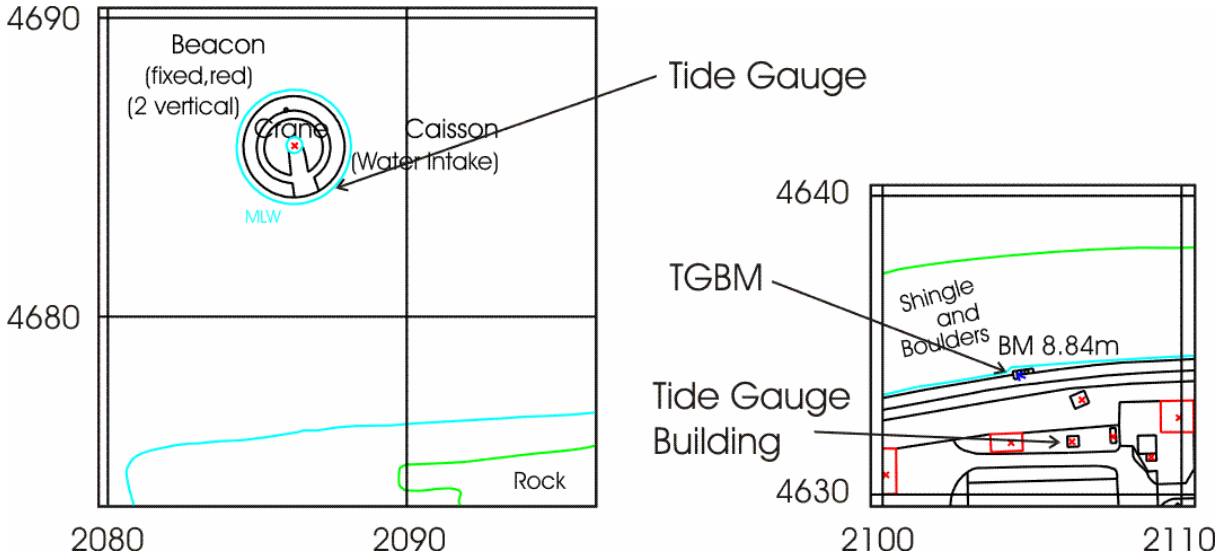
Levelling No levelling was carried out in 2014

Site visits

12/03/2014 (Day 071)	Maintenance. Meeting with Doug Brown (HP) to discuss Caisson access.
12/06/2014 (Day 163)	Maintenance. Access to the caisson was planned but this was cancelled by HP due to a fire service strike.

Notes on Data Quality
Channel 2 has been flagged throughout, due to the sensor being fouled up. In December Channel 1 was flagged on low waters. This is possibly due to turbulence in stormy weather.

Hinkley Point – Map & Images of Site



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	0.892	3	13:45:00				-0.61	25	22:15:00			
Feb	1.895	12	13:30:00				-0.537	28	07:45:00			
Mar	0.775	2	17:15:00				-0.533	12	09:00:00			
Apr	0.521	26	11:30:00				-0.294	15	12:45:00			
May	0.636	10	15:30:00				-0.392	16	14:00:00			
Jun	0.333	6	21:00:00				-0.281	12	07:00:00			
July	0.367	4	11:30:00				-0.259	11	06:30:00			
Aug	0.594	10	13:15:00				-0.185	4	07:00:00			
Sep	0.285	19	02:15:00				-0.328	2	06:45:00			
Oct	0.678	21	09:30:00				-0.25	22	02:30:00			
Nov	0.798	13	15:45:00				-0.257	17	19:15:00			
Dec	0.796	12	02:45:00				-0.509	6	02:30:00			

	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	7.454	3	08:00:00				-5.228	31	00:45:00			
Feb	7.315	1	07:45:00				-5.567	2	02:45:00			
Mar	7.346	2	07:15:00				-5.72	4	15:15:00			
Apr	6.729	1	07:45:00				-5.524	1	01:45:00			
May	6.019	1	08:00:00				-5.396	16	01:30:00			
Jun	6.202	15	20:30:00				-5.428	15	02:00:00			
July	6.76	14	20:15:00				-5.557	15	02:45:00			
Aug	7.142	12	20:00:00				-5.73	13	02:30:00			
Sep	7.124	10	19:45:00				-5.877	11	02:15:00			
Oct	7.071	8	18:30:00				-5.409	10	01:45:00			
Nov	6.617	6	18:15:00				-4.925	8	01:30:00			
Dec	6.305	23	07:30:00				-5.17	25	15:15:00			

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.558		
February	25	0.619		
March	29	0.319		
April	29	0.369		
May	31	0.342		
June	30	0.301		
July	31	0.344		
August	31	0.413		
September	30	0.369		
October	31	0.515		
November	30	0.555		
December	31	0.384		
TOTAL & AVG	359	0.424		

*	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 a full-tide and a mid-tide bubbler gauge, with a back-up Munro float gauge

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

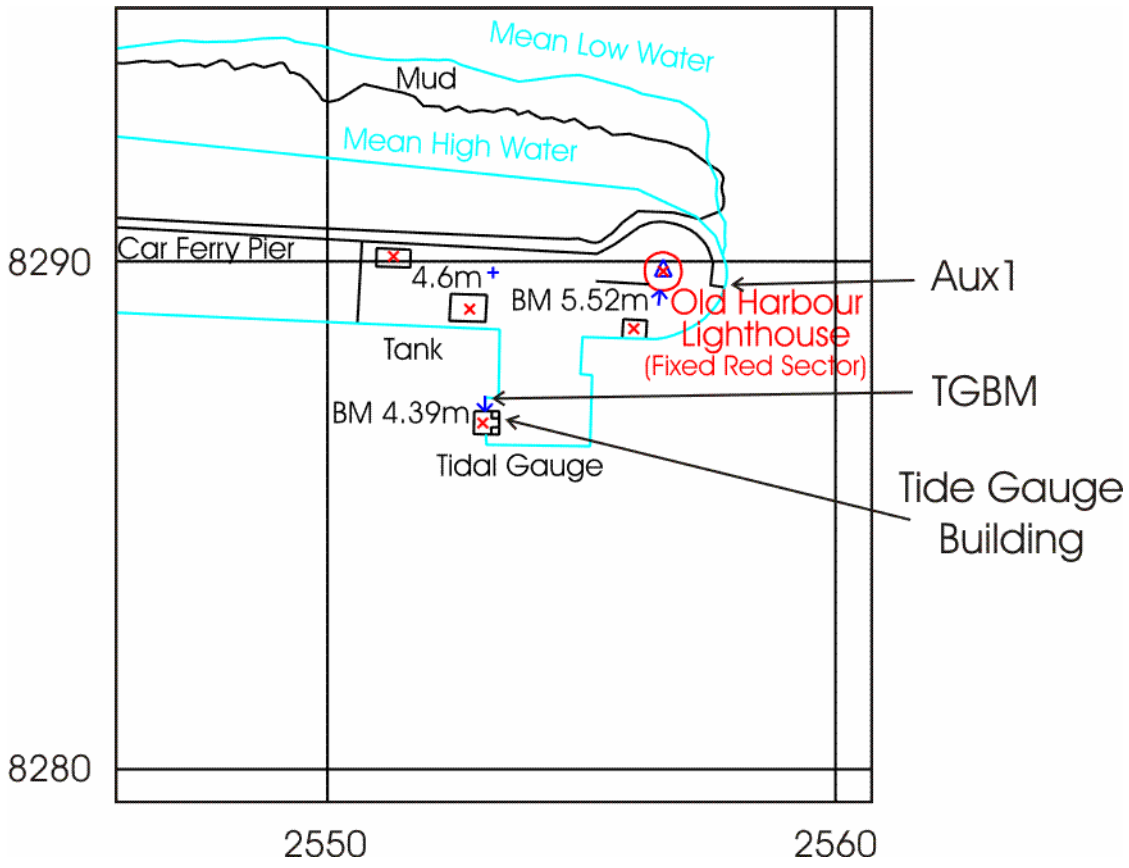
Levelling No levelling was carried out in 2014

Site visits

14/01/2014 (Day 014)	Changing the Vega Radar integration period and testing.
07/03/2014 (Day 066)	Changing the Vega Radar integration period and testing.
24/04/2014 (Day 114)	Site visit with Paul Swinburne to view condition of building and view the test site in general - bubbler, float and radar gauges.
06/07/2014 (Day 187)	Installation of Bournemouth radar for testing.
18/08/2014 (Day 230)	Visit to resolve problem with channel 2. Radar removed from channel 1 and float gauge reinstated.
12/10/2014 (Day 285)	Bubbler channel blocked - cleared OK. Float gauge serviced.

Notes on Data Quality
The site met the agreed target of being operational for at least 75% of each calendar month in 2014.

Holyhead – Map & Images of Site



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	0.852	26	13:30:00	0.869	26	13:30:00	-0.335	26	01:15:00	-0.308	26	01:00:00
Feb	1.134	8	12:15:00	1.479	12	15:00:00	-0.085	2	06:45:00	-0.43	28	11:45:00
Mar	0.576	20	13:30:00	0.568	20	13:15:00	-0.351	25	22:15:00	-0.362	25	22:15:00
Apr	0.421	6	15:30:00	0.423	6	11:00:00	-0.235	14	06:00:00	-0.24	14	14:15:00
May	0.441	10	15:15:00	0.454	10	15:15:00	-0.275	15	16:45:00	-0.267	15	16:45:00
Jun	0.194	27	13:45:00	0.18	27	13:45:00	-0.251	17	16:45:00	-0.257	17	16:45:00
July	0.259	4	15:15:00	0.249	4	15:15:00	-0.245	9	11:45:00	-0.239	9	11:45:00
Aug	0.291	10	05:00:00	0.309	10	05:00:00	-0.108	15	13:45:00	-0.116	24	00:15:00
Sep	0.161	17	23:00:00	0.138	17	22:15:00	-0.176	1	10:45:00	-0.182	1	10:30:00
Oct	0.785	21	05:00:00	0.78	21	05:00:00	-0.369	21	20:45:00	-0.376	21	20:45:00
Nov	0.582	14	05:30:00	0.563	14	05:30:00	-0.147	23	11:15:00	-0.153	5	10:15:00
Dec	0.536	9	18:30:00	0.526	9	18:45:00	-0.466	28	04:45:00	-0.484	28	04:45:00

	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	3.66	3	11:00:00	3.689	3	11:00:00	-2.541	30	16:00:00	-2.537	30	16:00:00
Feb	3.543	3	12:45:00	3.555	3	12:30:00	-2.845	2	18:15:00	-2.946	28	15:30:00
Mar	3.04	31	10:30:00	3.376	2	10:45:00	-2.725	30	16:00:00	-3.002	3	17:45:00
Apr	2.97	1	11:15:00	2.964	1	11:15:00	-2.638	1	05:00:00	-2.63	1	05:00:00
May	2.68	18	00:15:00	2.674	18	00:15:00	-2.629	17	05:45:00	-2.627	17	05:45:00
Jun	2.72	14	23:15:00	2.704	14	23:15:00	-2.746	16	06:15:00	-2.75	16	06:15:00
July	3.125	14	23:45:00	3.122	14	23:45:00	-2.886	15	06:00:00	-2.875	15	06:00:00
Aug	3.295	12	23:30:00	3.305	12	23:30:00	-2.873	13	05:45:00	-2.765	12	05:00:00
Sep	3.225	10	23:15:00	3.224	10	23:15:00	-2.924	10	04:45:00	-2.925	10	04:30:00
Oct	3.485	8	22:00:00	2.975	6	20:30:00	-2.508	10	05:00:00	-2.06	24	04:00:00
Nov	3.341	6	21:45:00	3.344	6	21:45:00	-2.241	24	17:15:00	-2.251	24	17:15:00
Dec	2.956	23	10:45:00	2.961	23	10:45:00	-2.589	25	18:45:00	-2.615	25	18:30:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.446	31	0.455
February	10	*	28	0.495
March	10	*	31	0.165
April	30	0.203	30	0.206
May	31	0.171	31	0.173
June	30	0.168	30	0.161
July	28	0.194	31	0.202
August	31	0.264	23	0.286
September	30	0.24	30	0.227
October	31	0.426	18	0.454
November	30	0.453	30	0.443
December	31	0.256	31	0.247
TOTAL & AVG	323	**	344	0.293

*	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

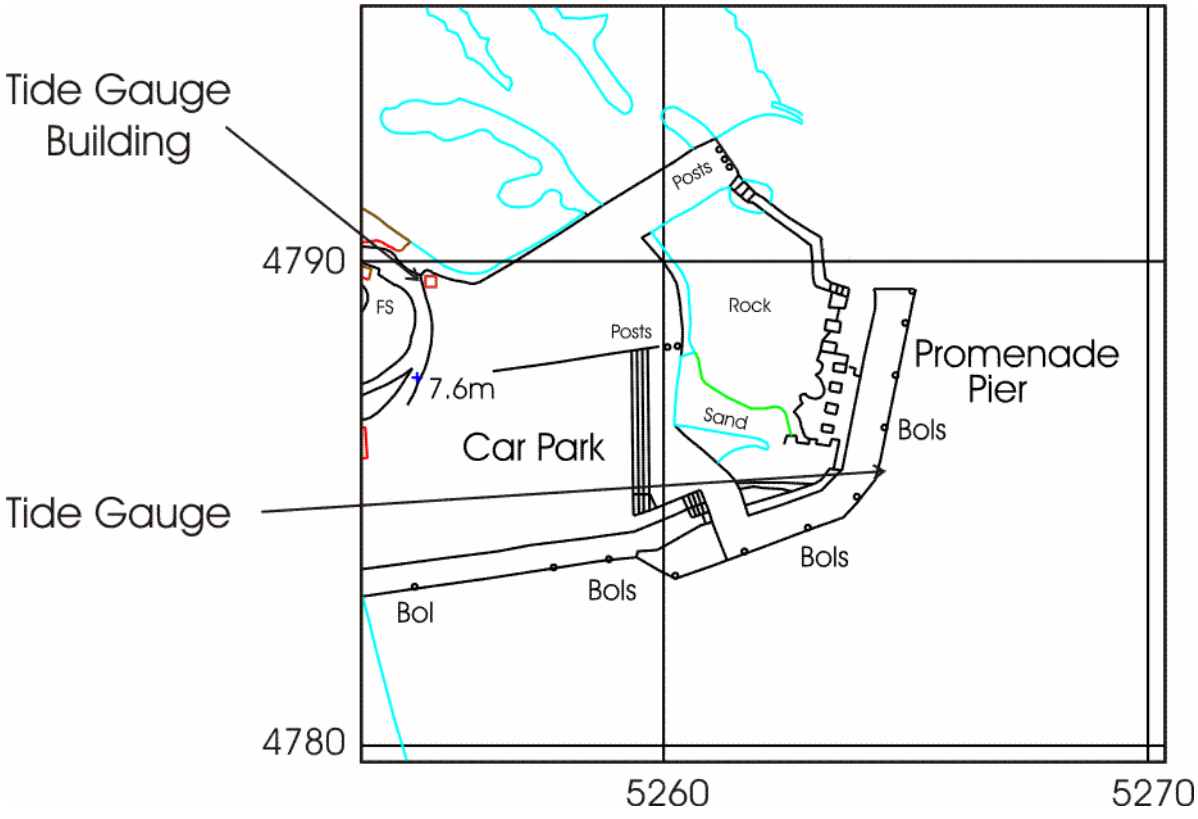
Benchmark Relationships
TGZ = Admiralty Chart Datum (ACD)
TGZ = 4.80m below Ordnance Datum Newlyn (ODN)
TGZ = 12.379m below TGBM
TGZ = 10.76m below Aux1
TGZ = 32.541m below Aux2

Levelling No levelling was carried out in 2014

Site visits
29/01/2014 (Day 029) 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 2014.

Ilfracombe – Map & Images of Site



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	0.825	1	10:30:00	0.832	1	10:30:00	-0.444	25	21:15:00	-0.433	25	21:00:00
Feb	1.452	12	14:15:00	1.462	12	14:15:00	-0.339	28	07:00:00	-0.328	28	07:00:00
Mar	0.631	2	15:30:00	0.641	2	15:30:00	-0.281	3	17:15:00	-0.229	16	11:00:00
Apr	0.514	26	11:00:00	0.526	26	11:00:00	-0.209	14	10:30:00	-0.196	14	10:30:00
May	0.469	10	13:00:00	0.482	10	13:00:00	-0.241	16	12:00:00	-0.229	16	12:00:00
Jun	0.268	27	19:15:00	0.28	27	19:15:00	-0.177	17	13:00:00	-0.165	17	13:00:00
July	0.305	5	00:30:00	0.318	5	00:30:00	-0.133	9	05:15:00	-0.12	9	05:15:00
Aug	0.346	10	01:00:00	0.363	10	01:00:00	-0.069	24	05:45:00	-0.058	23	18:30:00
Sep	0.24	17	21:15:00	0.252	17	21:15:00	-0.164	2	05:45:00	-0.151	2	05:45:00
Oct	0.535	17	19:15:00	0.546	17	19:15:00	-0.278	21	15:45:00	-0.282	21	15:45:00
Nov	0.726	13	14:15:00	0.738	14	03:00:00	-0.097	20	07:45:00	-0.087	23	16:45:00
Dec	0.718	12	02:15:00	0.73	12	02:15:00	-0.328	6	01:00:00	-0.32	6	02:00:00

	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	5.698	3	07:00:00	5.698	3	07:00:00	-4.271	4	01:30:00	-4.026	30	23:45:00
Feb	5.599	3	08:15:00	5.602	3	08:15:00	-4.66	2	13:45:00	-4.287	28	23:30:00
Mar	5.615	2	06:30:00	5.621	2	06:30:00	-4.6	3	13:15:00	-4.553	1	11:45:00
Apr	5.068	1	06:45:00	5.073	1	06:45:00	-4.346	1	12:45:00	-4.33	1	12:45:00
May	4.506	1	07:00:00	4.513	1	07:00:00	-4.183	16	00:15:00	-4.171	16	00:15:00
Jun	4.652	15	19:45:00	4.657	15	19:45:00	-4.217	15	00:45:00	-4.207	15	01:00:00
July	5.126	14	19:30:00	5.131	14	19:30:00	-4.399	15	01:30:00	-4.385	15	01:30:00
Aug	5.434	12	19:15:00	5.437	12	19:15:00	-4.579	13	01:15:00	-4.577	13	01:15:00
Sep	5.422	10	19:00:00	5.426	10	19:00:00	-4.622	11	01:00:00	-4.614	11	01:00:00
Oct	5.441	8	17:45:00	5.446	8	17:45:00	-4.219	10	00:30:00	-4.206	10	00:30:00
Nov	5.116	6	17:30:00	5.12	6	17:30:00	-3.836	8	00:15:00	-3.834	8	00:15:00
Dec	4.724	23	06:30:00	4.725	23	06:30:00	-4.057	25	14:15:00	-4.044	25	14:15:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.408	25	0.38
February	28	0.435	23	0.48
March	31	0.137	27	0.14
April	30	0.202	30	0.214
May	31	0.177	31	0.188
June	30	0.165	30	0.176
July	31	0.192	31	0.204
August	31	0.249	31	0.26
September	30	0.232	30	0.244
October	31	0.365	31	0.377
November	30	0.428	28	0.436
December	31	0.199	29	0.202
TOTAL & AVG	365	0.266	346	0.275

*	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 2014

Site visits

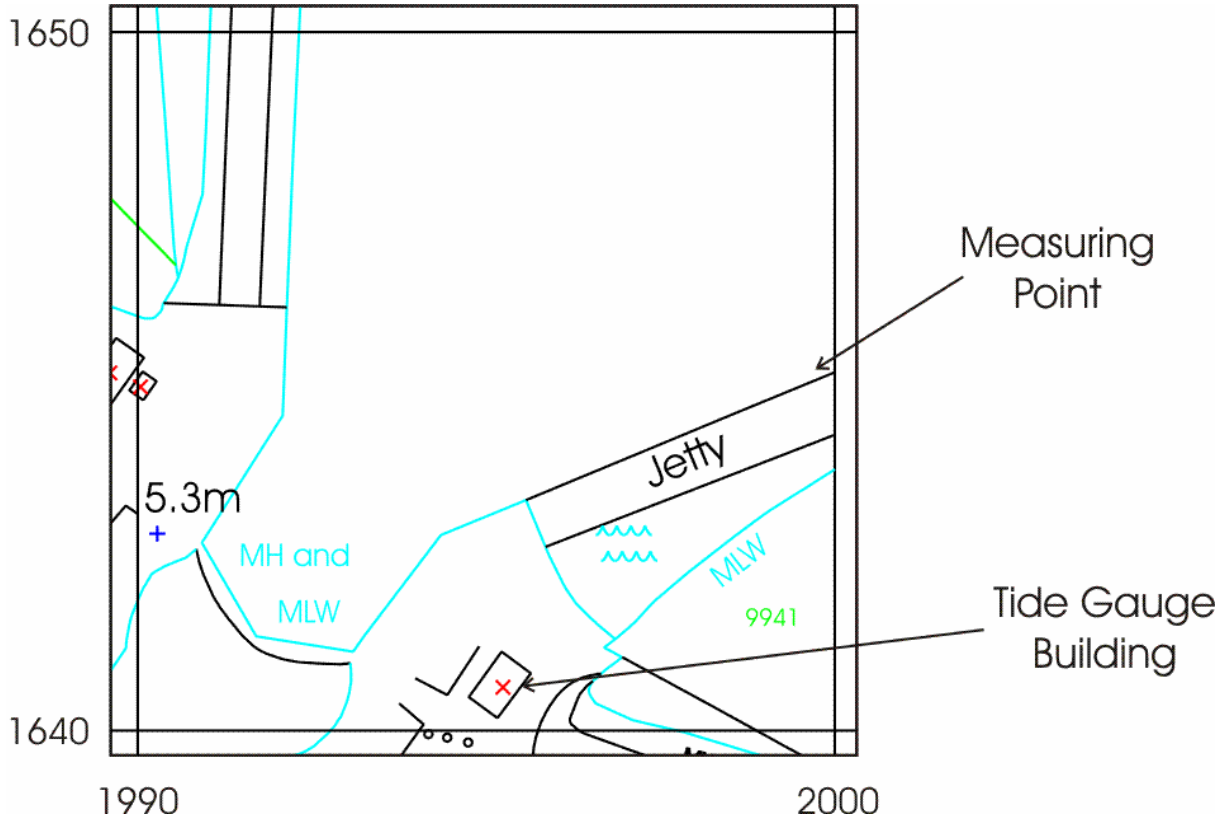
27/08/2014 (Day 239) Investigate blocking channels. Pneumatic tubes had come adrift along the jetty producing a large loop, which had filled with water and silt. This was cleared and the tubes temporarily secured. Both lines are now clear but channel 2 does indicate some restriction when purged.

12/09/2014 (Day 255) Channel 2 lost pressure on the rising tide on 03/09. Electrical contractors attended site on 01/09 (TGI not informed) and entered the pneumatic cabinet. The fault will be investigated with this in mind. The EA investigated the phone line fault (reported Dec 13). The fault is with the lightning arrester as suspected, they will replace in due course. GH visited on 12/09 and found the compressor isolator to be off. It is likely that the isolator was switched off during the electrical inspection.

29/10/2014 (Day 302) Site meeting with Paul Swinburne to look at the possible options for a site move due to the problems with the pneumatic lines running under the road. G Hodge (Deputy Dock Master) has informed me that the site of the gauge is to be redeveloped over the next 12 months.

Notes on Data Quality
In January, August and September, some data was flagged as unreliable. See description of site visits above.

Immingham – Map & Images of Site



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	0.676	4	15:30:00	0.682	4	15:30:00	-1.072	26	16:30:00	-1.073	26	16:30:00
Feb	0.503	28	02:00:00	0.548	24	20:15:00	-0.957	1	22:00:00	-1.008	13	00:45:00
Mar	0.368	21	06:30:00	0.975	15	01:30:00	-0.421	5	08:00:00	-0.85	8	17:45:00
Apr	0.211	14	03:15:00	0.488	18	02:30:00	-0.402	15	15:15:00	-0.458	16	01:00:00
May	0.063	28	03:00:00	0.288	6	20:00:00	-0.186	31	18:15:00	-0.435	15	00:15:00
Jun				0.232	29	02:30:00				-0.294	17	20:00:00
July	0.125	13	17:00:00	0.39	9	09:00:00	-0.413	16	20:30:00	-0.416	16	20:30:00
Aug	0.28	10	14:15:00	0.336	14	14:00:00	-0.312	11	13:45:00	-0.431	11	13:15:00
Sep	0.242	13	14:15:00	0.257	13	14:15:00	-0.275	12	19:30:00	-0.27	12	19:30:00
Oct	0.27	31	08:30:00	0.257	31	08:30:00	-0.286	30	13:15:00	-0.28	30	13:15:00
Nov	0.517	8	14:00:00	0.425	2	19:15:00	-0.555	6	18:45:00	-0.498	6	17:45:00
Dec	1.219	10	04:00:00				-1.376	9	19:00:00			

	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	3.692	2	18:30:00	3.699	2	18:30:00	-3.357	3	13:30:00	-3.546	6	03:30:00
Feb	3.847	2	19:45:00	3.864	2	19:45:00	-3.994	2	01:45:00	-4.108	1	01:00:00
Mar	3.104	19	19:15:00	3.817	3	19:30:00	-1.247	19	03:30:00	-3.703	3	01:45:00
Apr	2.626	14	04:15:00	3.547	1	19:00:00	-0.429	14	01:45:00	-3.408	1	01:00:00
May	2.647	29	17:30:00	3.252	17	07:15:00	-0.223	31	16:30:00	-3.238	15	00:15:00
Jun				3.345	16	07:45:00				-3.29	15	13:45:00
July	3.676	15	07:45:00	3.667	15	07:45:00	-1.602	14	15:30:00	-3.486	16	15:15:00
Aug	3.862	13	07:30:00	3.854	13	07:30:00	-2.814	28	13:45:00	-3.667	12	13:30:00
Sep	3.826	12	07:30:00	3.826	12	07:30:00	-3.26	12	14:30:00	-3.238	12	14:30:00
Oct	2.505	30	22:00:00	2.495	30	22:00:00	-1.852	31	04:30:00	-1.851	31	04:30:00
Nov	3.651	8	06:15:00	3.671	8	06:15:00	-3.057	7	12:15:00	-2.259	4	09:45:00
Dec	3.604	23	18:45:00				-3.076	26	03:00:00			

	Mean Sea Level			
	Channel 1		Channel 2	
January	0	*	14	*
February	0	*	24	0.154
March	0	*	31	0.141
April	0	*	30	0.18
May	0	*	31	0.145
June	0	*	30	0.166
July	0	*	31	0.226
August	2	*	26	0.246
September	5	*	4	*
October	1	*	1	*
November	30	0.404	3	*
December	31	0.393	0	*
TOTAL & AVG	69	**	225	**

*	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

Port Erin (Isle of Man) – 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 2014

Site visits
No site visits were carried out in 2014

Notes on Data Quality
The site met the agreed target of being operational for at least 75% of each calendar month in 2014.

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

Image: Isle of Man Government ©Google 2013

Port Erin (Isle Of Man) – 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	0.906	3	16:00:00	0.921	3	16:00:00	-0.272	26	02:30:00	-0.206	24	00:30:00
Feb	1.28	12	16:15:00	1.294	12	16:15:00	-0.38	28	13:00:00	-0.373	28	13:00:00
Mar	0.567	20	11:30:00	0.579	20	11:30:00	-0.379	25	22:15:00	-0.362	25	22:00:00
Apr	0.517	6	14:00:00	0.536	6	14:00:00	-0.189	14	15:45:00	-0.181	14	15:45:00
May	0.453	10	16:00:00	0.458	10	16:00:00	-0.228	15	19:30:00	-0.224	15	19:30:00
Jun	0.185	10	19:00:00	0.187	10	19:00:00	-0.24	17	17:00:00	-0.236	17	17:00:00
July	0.299	4	09:45:00	0.304	4	09:45:00	-0.222	9	10:00:00	-0.217	9	10:00:00
Aug	0.338	29	08:15:00	0.34	29	08:15:00	-0.108	15	14:30:00	-0.106	15	14:30:00
Sep	0.132	17	23:15:00	0.136	17	23:15:00	-0.178	1	12:45:00	-0.175	1	12:45:00
Oct	0.785	21	06:30:00	0.787	21	06:30:00	-0.371	21	21:00:00	-0.369	21	21:00:00
Nov	0.597	6	17:15:00	0.6	6	17:15:00	-0.136	5	11:00:00	-0.132	5	11:00:00
Dec	0.573	9	17:45:00	0.576	9	17:45:00	-0.492	28	03:45:00	-0.485	28	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	3.856	3	12:30:00	3.869	3	12:30:00	-2.526	30	16:45:00	-2.506	30	16:45:00
Feb	3.602	1	12:15:00	3.615	1	12:15:00	-2.874	28	16:30:00	-2.866	28	16:30:00
Mar	3.33	2	11:45:00	3.333	2	11:45:00	-2.87	3	18:45:00	-2.859	3	18:45:00
Apr	2.86	1	12:00:00	2.879	1	12:00:00	-2.583	1	18:15:00	-2.567	1	18:15:00
May	2.638	18	01:15:00	2.643	18	01:15:00	-2.612	17	06:45:00	-2.607	17	06:45:00
Jun	2.604	16	01:00:00	2.608	16	01:00:00	-2.755	16	07:15:00	-2.752	16	07:15:00
July	3.003	15	00:45:00	3.008	15	00:45:00	-2.824	15	07:00:00	-2.82	15	07:00:00
Aug	3.186	13	00:30:00	3.189	13	00:30:00	-2.779	13	06:45:00	-2.775	13	06:45:00
Sep	3.082	11	00:00:00	3.087	11	00:00:00	-2.858	10	05:45:00	-2.854	10	05:45:00
Oct	3.387	8	23:00:00	3.389	8	23:00:00	-2.455	10	06:00:00	-2.452	10	06:00:00
Nov	3.319	6	22:45:00	3.319	6	22:45:00	-2.296	5	03:30:00	-2.295	5	03:30:00
Dec	2.953	23	12:00:00	2.959	23	12:00:00	-2.605	25	19:45:00	-2.599	25	19:45:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.41	24	0.48
February	28	0.454	28	0.469
March	31	0.122	31	0.134
April	30	0.143	30	0.153
May	31	0.104	31	0.108
June	30	0.086	30	0.089
July	31	0.134	31	0.139
August	31	0.194	31	0.198
September	30	0.152	30	0.156
October	31	0.359	31	0.362
November	28	0.392	28	0.394
December	31	0.2	31	0.205
TOTAL & AVG	363	0.229	356	0.241

*	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

Port Ellen (Isle of Islay) – 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

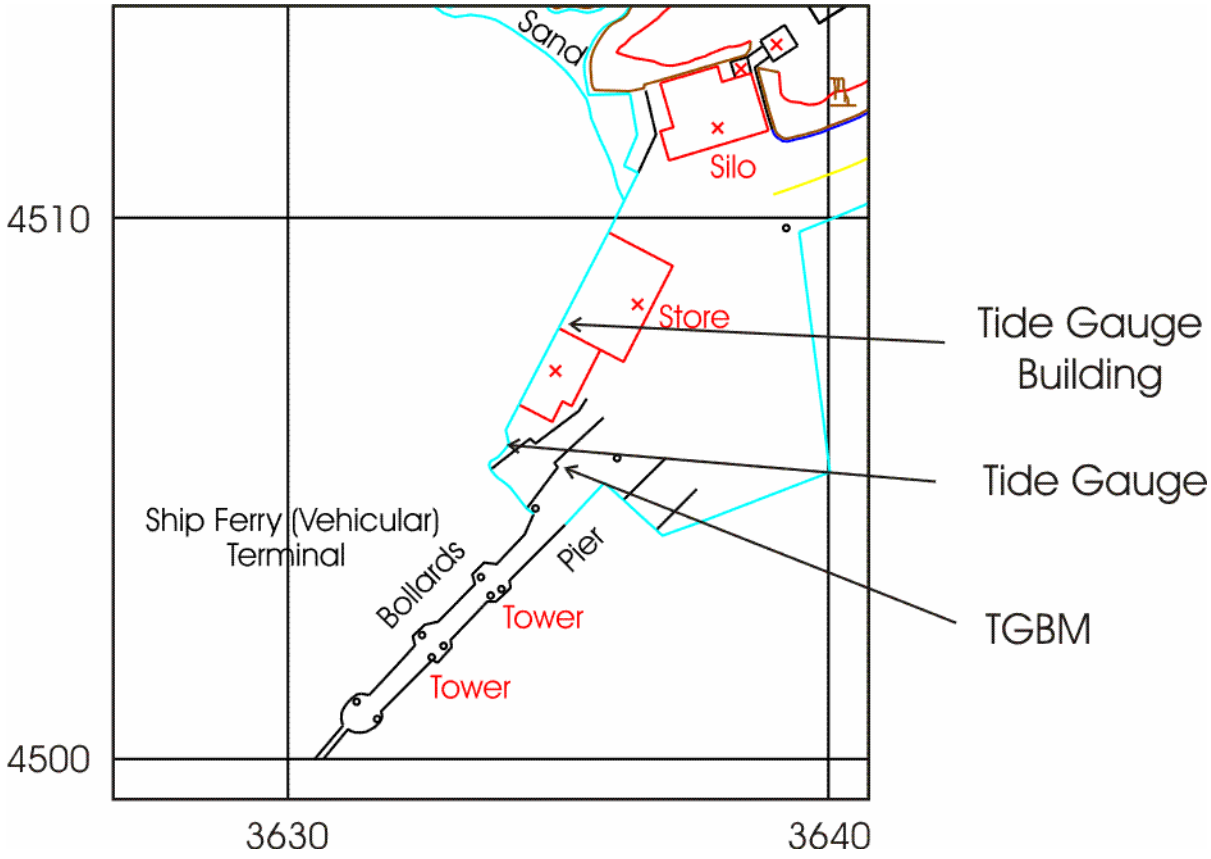
Benchmark Relationships
TGZ = Admiralty Chart Datum (ACD)
TGZ = 0.19m below Ordnance Datum Newlyn (ODN)
TGZ = 2.839m below TGBM

Levelling No levelling was carried out in 2014

Site visits
03/03/2014 (Day 062) Site survey and sealing of the service ducts.
12/11/2014 (Day 316) Survey of site. Old TG steelwork brought back to NOC.

Notes on Data Quality
No data as gauge was removed from network due to harbour redevelopment on 08/02/2011. Work on a replacement installation has commenced and is ongoing.

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



Port Ellen (Isle of Islay) – Statistics

The gauge wasn't operational during 2014, so no statistics were produced.

St Helier (Jersey) – 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

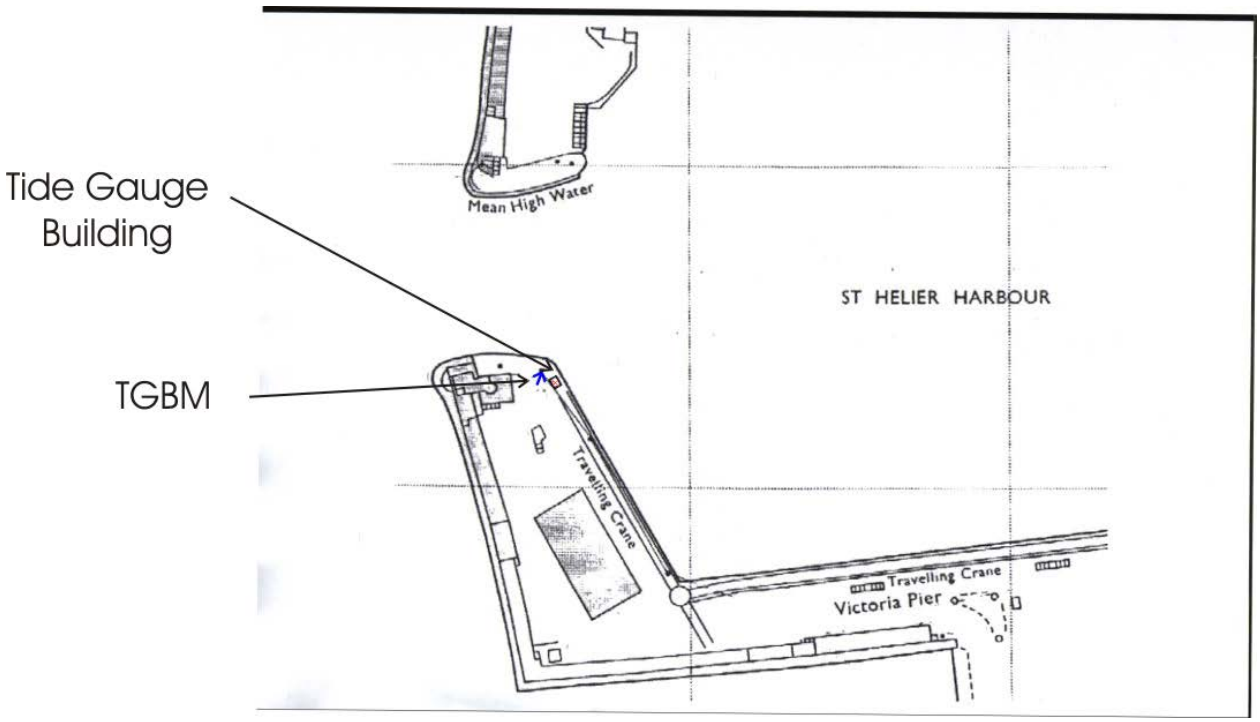
Levelling Bench marks levelled by TGI on 19/03/2014

Site visits

19/03/2014 (Day 078)	Maintenance. Compressor change.
15/09/2014 (Day 258)	Maintenance. GSM not connecting on O2 SIM. Latest version of S500 software (v11.0) loaded and problem resolved.

Notes on Data Quality
The site met the agreed target of being operational for at least 75% of each calendar month in 2014.

St Helier (Jersey) – Map & Images of Site



St Helier (Jersey) – 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	0.752	3	13:00:00	0.753	3	13:00:00	-0.232	24	18:15:00	-0.235	24	18:15:00
Feb	1.205	14	22:30:00	1.194	14	22:30:00	-0.274	2	18:15:00	-0.287	2	18:15:00
Mar	0.542	2	20:30:00	0.534	2	20:30:00	-0.337	11	08:30:00	-0.341	11	08:30:00
Apr	0.477	26	09:15:00	0.47	26	09:15:00	-0.286	16	02:15:00	-0.292	16	02:15:00
May	0.387	10	13:00:00	0.379	10	13:00:00	-0.363	17	05:15:00	-0.37	17	05:15:00
Jun	0.305	28	10:00:00	0.303	28	10:00:00	-0.357	17	06:30:00	-0.361	17	06:30:00
July	0.32	18	02:30:00	0.316	18	02:30:00	-0.326	17	07:15:00	-0.327	17	07:15:00
Aug	0.585	10	10:30:00	0.578	10	10:30:00	-0.266	16	07:30:00	-0.264	15	07:15:00
Sep	0.266	19	01:00:00	0.261	19	01:00:00	-0.389	12	06:30:00	-0.389	12	06:15:00
Oct	0.525	21	09:15:00	0.523	21	09:15:00	-0.275	22	14:45:00	-0.276	22	14:45:00
Nov	0.656	14	05:15:00	0.658	14	05:15:00	-0.261	24	17:00:00	-0.257	24	17:00:00
Dec	0.456	12	02:30:00	0.45	12	02:30:00	-0.501	28	20:30:00	-0.514	28	20:30:00

	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	6.07	3	08:00:00	6.066	3	08:00:00	-5.048	31	13:15:00	-5.053	31	13:15:00
Feb	6.104	3	09:00:00	6.099	3	09:00:00	-5.484	2	15:00:00	-5.489	2	15:00:00
Mar	6.467	3	07:45:00	6.456	3	07:45:00	-5.316	2	14:00:00	-5.323	2	14:00:00
Apr	5.87	1	07:15:00	5.862	1	07:15:00	-5.151	1	01:45:00	-5.158	1	01:45:00
May	5.162	16	19:30:00	5.156	16	19:30:00	-4.953	17	02:30:00	-4.958	17	02:30:00
Jun	5.375	15	20:15:00	5.371	15	20:15:00	-5.007	16	03:00:00	-5.01	16	03:00:00
July	5.833	14	20:00:00	5.83	14	20:00:00	-5.248	15	02:45:00	-5.251	15	02:45:00
Aug	6.238	12	19:45:00	6.233	12	19:45:00	-5.413	13	02:45:00	-5.413	13	02:45:00
Sep	6.212	10	19:30:00	6.21	10	19:30:00	-5.587	11	02:15:00	-5.588	11	02:15:00
Oct	6.143	9	19:00:00	6.132	9	19:00:00	-5.104	10	01:45:00	-5.107	10	01:45:00
Nov	5.902	7	06:15:00	5.897	7	06:15:00	-4.566	8	01:15:00	-4.562	8	01:15:00
Dec	5.517	24	07:45:00	5.499	24	07:45:00	-4.836	24	14:30:00	-4.848	24	14:30:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.377	31	0.372
February	28	0.396	28	0.388
March	31	0.116	31	0.109
April	30	0.175	30	0.168
May	31	0.164	31	0.158
June	30	0.145	30	0.141
July	31	0.173	31	0.17
August	31	0.222	31	0.22
September	30	0.195	30	0.192
October	31	0.304	31	0.303
November	30	0.405	30	0.407
December	31	0.169	31	0.164
TOTAL & AVG	365	0.237	365	0.233

*	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

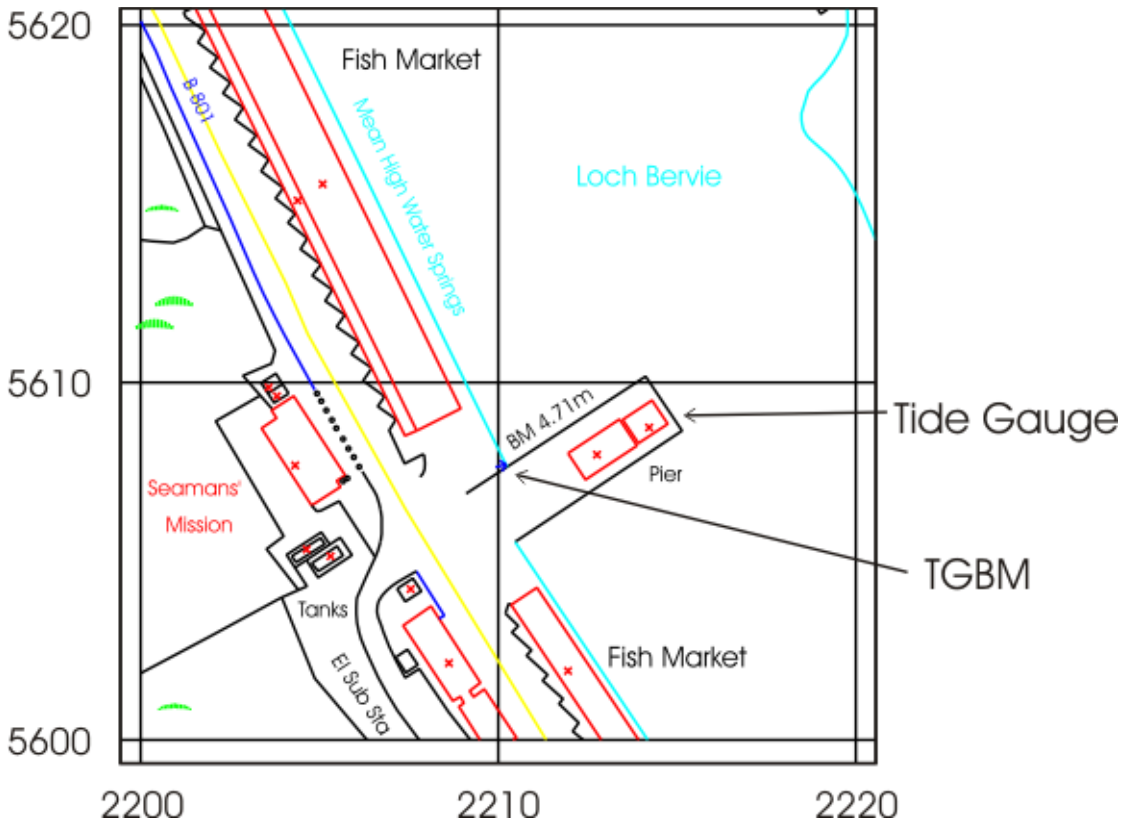
Benchmark Relationships
TGZ = Admiralty Chart Datum (ACD)
TGZ = 2.50m below Ordnance Datum Newlyn (ODN)
TGZ = 7.213m below TGBM

Levelling No levelling was carried out in 2014

Site visits
08/10/2014 (Day 281) 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 2014.

Kinlochbervie – Map & Images of Site



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	0.876	3	16:00:00	0.872	3	16:00:00	-0.315	29	09:15:00	-0.324	29	09:15:00
Feb	0.724	8	21:30:00	0.717	8	21:30:00	-0.102	16	05:30:00	-0.103	16	05:30:00
Mar	0.707	8	20:00:00	0.699	8	20:00:00	-0.321	26	10:30:00	-0.332	26	10:30:00
Apr	0.524	6	14:30:00	0.521	6	14:30:00	-0.143	21	06:30:00	-0.144	21	06:30:00
May	0.416	5	20:30:00	0.416	5	20:30:00	-0.245	23	18:45:00	-0.248	23	18:45:00
Jun	0.198	10	23:45:00	0.198	10	23:45:00	-0.217	17	13:45:00	-0.219	17	13:30:00
July	0.455	4	09:15:00	0.452	4	09:15:00	-0.141	9	07:45:00	-0.149	9	07:45:00
Aug	0.325	29	16:00:00	0.322	11	04:45:00	-0.201	18	01:30:00	-0.205	18	01:30:00
Sep	0.426	26	02:45:00	0.419	26	02:45:00	-0.19	21	02:30:00	-0.197	21	02:30:00
Oct	0.747	26	03:00:00	0.744	26	03:00:00	-0.223	22	00:00:00	-0.224	22	01:15:00
Nov	0.573	6	14:00:00	0.063	19	01:45:00	-0.215	5	01:00:00	-0.184	20	21:00:00
Dec	0.892	10	05:30:00				-0.519	28	04:45:00			

	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	3.425	3	08:30:00	3.421	3	08:30:00	-1.963	31	13:30:00	-1.972	31	13:30:00
Feb	3.44	1	08:15:00	3.433	1	08:15:00	-2.013	2	15:00:00	-2.023	2	15:00:00
Mar	3.161	3	08:30:00	3.157	3	08:30:00	-2.328	1	13:30:00	-2.336	1	13:30:00
Apr	2.662	1	07:45:00	2.658	1	07:45:00	-2.096	1	14:30:00	-2.102	1	14:30:00
May	2.516	17	21:15:00	2.508	17	21:15:00	-1.933	17	02:30:00	-1.94	17	02:30:00
Jun	2.408	14	20:00:00	2.408	14	20:00:00	-2.218	16	03:30:00	-2.22	16	03:30:00
July	2.938	14	20:45:00	2.931	14	20:45:00	-2.17	15	03:00:00	-2.181	15	03:00:00
Aug	3.086	11	19:45:00	3.085	12	20:15:00	-2.282	13	03:00:00	-2.284	13	03:00:00
Sep	2.916	9	19:15:00	2.911	9	19:15:00	-2.442	11	02:30:00	-2.449	11	02:30:00
Oct	3.051	8	19:00:00	3.049	8	19:00:00	-2.129	10	02:15:00	-2.133	10	02:15:00
Nov	3.107	6	18:30:00	2.191	21	06:00:00	-1.815	4	23:30:00	-1.43	21	00:15:00
Dec	2.913	24	08:30:00				-2.131	25	15:45:00			

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.631	31	0.625
February	28	0.642	23	0.627
March	31	0.412	31	0.405
April	30	0.373	30	0.373
May	31	0.301	31	0.298
June	30	0.283	30	0.281
July	31	0.37	31	0.365
August	31	0.387	31	0.384
September	30	0.377	30	0.371
October	31	0.609	29	0.607
November	30	0.569	0	*
December	31	0.517	0	*
TOTAL & AVG	365	0.456	297	**

*	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

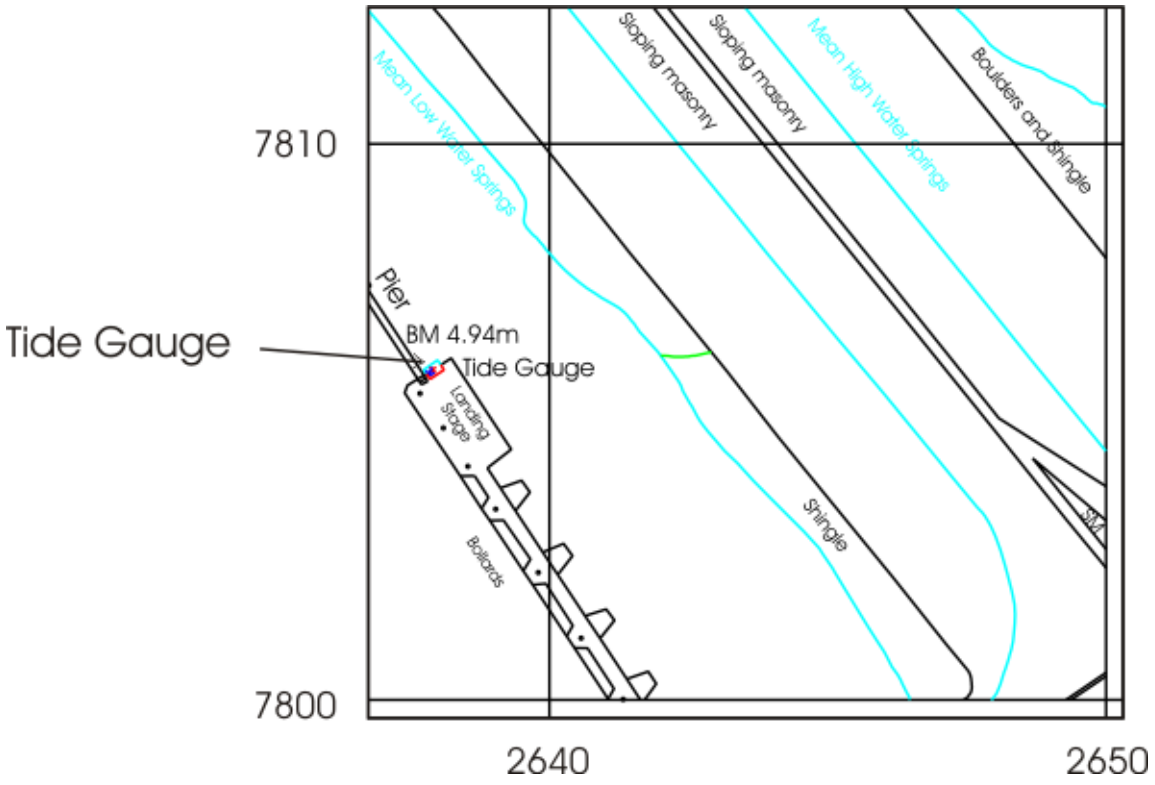
Benchmark Relationships
TGZ = Admiralty Chart Datum (ACD)
TGZ = 2.90m below Ordnance Datum Newlyn (ODN)
TGZ = 7.84mm below TGBM

Levelling No levelling was carried out in 2014

Site visits
10/10/2014 (Day 283) 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 2014.

Leith – Map & Images of Site



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	0.707	4	11:45:00	0.71	4	11:45:00	-0.61	26	18:00:00	-0.607	26	18:00:00
Feb	0.613	12	15:15:00	0.617	12	15:15:00	-0.469	13	03:30:00	-0.463	13	03:30:00
Mar	0.879	14	22:30:00	0.883	14	22:30:00	-0.687	8	15:00:00	-0.684	8	15:00:00
Apr	0.484	12	21:30:00	0.489	12	21:30:00	-0.259	15	11:45:00	-0.137	9	06:00:00
May	0.413	11	11:15:00	0.415	11	11:15:00	-0.276	14	18:15:00	-0.273	14	18:15:00
Jun	0.288	19	04:00:00	0.29	19	04:00:00	-0.178	17	12:45:00	-0.174	17	12:45:00
July	0.41	4	21:45:00	0.412	4	21:45:00	-0.181	20	07:30:00	-0.178	20	07:30:00
Aug	0.435	9	21:30:00	0.437	9	21:30:00	-0.276	11	09:00:00	-0.27	11	09:00:00
Sep	0.404	26	13:00:00	0.406	26	13:00:00	-0.222	13	16:45:00	-0.221	13	16:45:00
Oct	0.755	21	19:15:00	0.755	21	19:15:00	-0.315	22	15:30:00	-0.315	22	15:30:00
Nov	0.475	8	07:15:00	0.479	8	07:15:00	-0.194	14	17:30:00	-0.19	14	17:30:00
Dec	0.858	10	01:00:00	0.864	10	01:00:00	-0.736	9	15:15:00	-0.732	9	15:15:00

	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	3.623	4	16:15:00	3.628	4	16:15:00	-2.944	31	21:15:00	-2.94	31	21:15:00
Feb	3.298	1	15:30:00	3.302	1	15:30:00	-2.92	1	22:00:00	-2.914	1	22:00:00
Mar	3.298	2	15:15:00	3.3	2	15:15:00	-2.761	1	21:00:00	-2.758	1	21:00:00
Apr	3.016	1	15:30:00	3.019	1	15:30:00	-2.458	1	21:45:00	-2.456	1	21:45:00
May	2.718	1	03:45:00	2.72	1	03:45:00	-2.359	16	09:30:00	-2.357	16	09:30:00
Jun	2.763	15	03:45:00	2.765	14	03:00:00	-2.596	15	10:00:00	-2.593	15	10:00:00
July	3.097	14	03:15:00	3.1	14	03:15:00	-2.665	14	09:45:00	-2.662	14	09:45:00
Aug	3.4	13	04:00:00	3.402	13	04:00:00	-2.909	11	08:45:00	-2.905	11	08:45:00
Sep	3.283	10	02:45:00	3.285	10	02:45:00	-2.86	11	10:00:00	-2.857	11	10:00:00
Oct	3.418	9	02:15:00	3.421	9	02:15:00	-2.439	8	08:00:00	-2.436	8	08:00:00
Nov	3.154	8	02:45:00	3.157	8	02:45:00	-2.253	6	07:45:00	-2.25	6	07:45:00
Dec	3.146	23	15:00:00	3.149	23	15:00:00	-2.436	25	23:15:00	-2.434	25	23:15:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.356	31	0.359
February	28	0.393	28	0.396
March	31	0.254	31	0.257
April	30	0.271	24	0.273
May	31	0.241	31	0.243
June	30	0.252	30	0.254
July	31	0.298	31	0.3
August	31	0.322	31	0.325
September	30	0.321	30	0.323
October	31	0.452	31	0.454
November	30	0.432	30	0.435
December	31	0.361	31	0.364
TOTAL & AVG	365	0.329	359	0.332

*	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

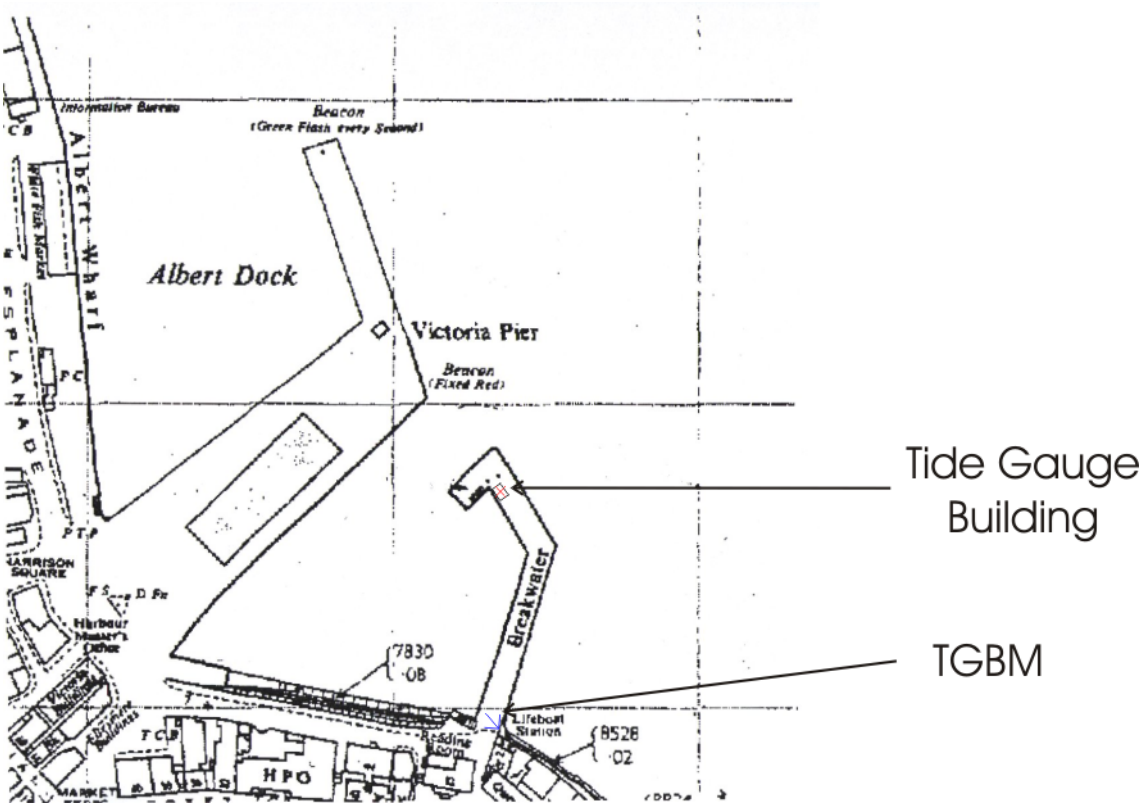
Benchmark Relationships
TGZ = Admiralty Chart Datum (ACD)
TGZ = 1.22m below Ordnance Datum Local (ODL)
TGZ = 4.57m below TGBM

Levelling No levelling was carried out in 2014

Site visits
31/03/2014 (Day 090) Maintenance. Compressor change.

Notes on Data Quality
The lower quality index for February to December is due to a feature of the near real time quality control algorithm. The algorithm requires two hours of data either side of high water, which, due to the position of the mid tide at Lerwick, is not always available, giving an erroneous impression of the data quality. The algorithm is being refined to perform better at these sites. The data inspected in delayed mode reveal no issues.

Lerwick – Map & Images of Site



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	0.444	7	07:15:00	0.453	7	07:15:00	-0.265	29	01:30:00	-0.256	29	01:30:00
Feb	0.438	9	08:45:00	0.447	9	08:45:00	-0.111	19	10:30:00	-0.101	19	10:30:00
Mar	0.498	21	03:30:00	0.508	21	03:30:00	-0.303	28	18:15:00	-0.295	28	18:15:00
Apr	0.392	12	16:30:00	0.4	12	16:30:00	-0.132	22	21:15:00	-0.123	22	21:15:00
May	0.32	6	17:30:00	0.329	6	17:30:00	-0.217	22	07:00:00	-0.209	23	15:00:00
Jun	0.138	10	16:30:00	0.146	10	16:30:00	-0.201	17	18:30:00	-0.192	17	18:30:00
July	0.366	4	16:30:00	0.375	4	16:30:00	-0.144	25	10:15:00	-0.135	25	10:15:00
Aug	0.294	9	22:00:00	0.303	9	22:00:00	-0.125	27	01:45:00	-0.116	27	01:45:00
Sep	0.281	26	15:15:00	0.29	26	15:15:00	-0.206	13	14:00:00	-0.198	13	14:00:00
Oct	0.437	21	08:45:00	0.445	21	08:45:00	-0.121	14	08:15:00	-0.113	14	08:15:00
Nov	0.345	2	03:45:00	0.355	2	03:45:00	-0.16	19	23:00:00	-0.152	19	23:00:00
Dec	0.579	10	18:15:00	0.588	10	18:15:00	-0.339	28	16:00:00	-0.331	28	16:00:00

	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	1.589	4	12:45:00	1.596	4	12:45:00	-1.01	30	16:30:00	-1.001	30	16:30:00
Feb	1.448	2	12:45:00	1.454	2	12:45:00	-0.928	2	19:00:00	-0.919	2	19:00:00
Mar	1.264	2	11:15:00	1.273	2	11:15:00	-1.252	29	16:00:00	-1.244	29	16:00:00
Apr	1.029	17	12:15:00	1.037	17	12:15:00	-1.022	1	18:00:00	-1.014	1	18:00:00
May	0.954	18	00:45:00	0.961	18	00:45:00	-0.988	2	06:30:00	-0.979	2	06:30:00
Jun	0.907	13	23:15:00	0.914	13	23:15:00	-1.152	16	06:45:00	-1.143	16	06:45:00
July	1.223	15	00:00:00	1.232	15	00:00:00	-1.057	16	07:30:00	-1.048	16	07:30:00
Aug	1.421	11	23:15:00	1.429	11	23:15:00	-1.014	13	06:15:00	-1.004	13	06:15:00
Sep	1.193	9	23:15:00	1.202	9	23:15:00	-1.138	11	06:00:00	-1.129	11	06:00:00
Oct	1.394	26	12:15:00	1.401	26	12:15:00	-0.809	7	03:30:00	-0.801	7	03:30:00
Nov	1.293	7	11:15:00	1.3	7	11:15:00	-0.782	5	03:15:00	-0.773	5	03:15:00
Dec	1.354	10	13:00:00	1.364	10	13:00:00	-1.043	25	19:30:00	-1.034	25	19:30:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.205	31	0.214
February	28	0.252	28	0.26
March	31	0.074	31	0.083
April	30	0.024	30	0.032
May	31	-0.02	31	-0.012
June	30	-0.008	30	0.001
July	31	0.069	31	0.078
August	31	0.114	31	0.123
September	30	0.085	30	0.093
October	31	0.267	31	0.275
November	30	0.213	30	0.222
December	31	0.236	31	0.244
TOTAL & AVG	365	0.126	365	0.134

*	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

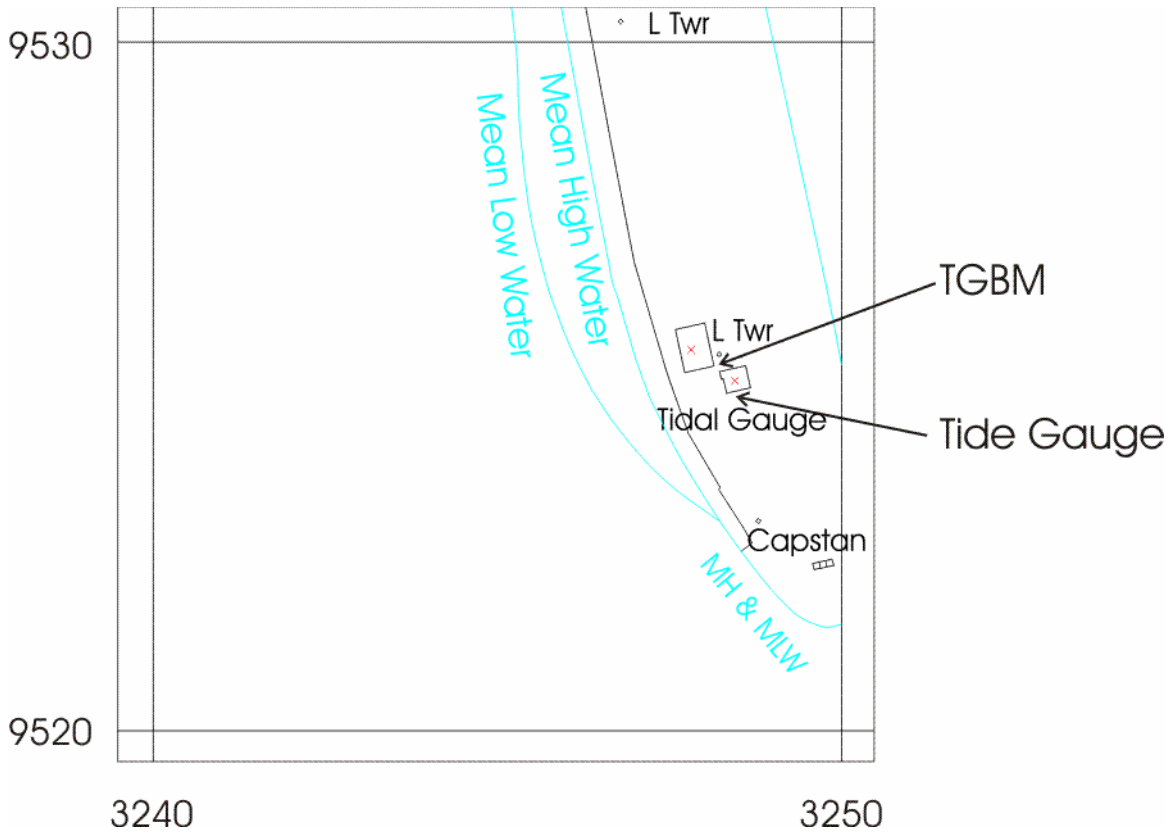
Levelling Bench marks levelled by TGI on 23/01/2014 and 21/05/2014

Site visits

23/01/2014 (Day 023)	Maintenance.
06/03/2014 (Day 065)	Site meeting with Warrington EA.
25/03/2014 (Day 084)	Meeting with Warrington EA - calibration of the EA transducer.
03-11/04/2014 (Day 093-101)	Site refurbishment work, painting interior of new building
23/04/2014 (Day 113)	Visit with Paul Swinburne to view site problems and refurbishment.
21/05/2014 (Day 141)	Installation of outstation and pneumatic panel.
02/07/2014 (Day 183)	Maintenance. Inst of 12v compressor for testing.
18/07/2014 (Day 199)	Attended site with engineer to assess routing of pneumatic tubes.
05/08/2014 (Day 217)	Meeting with EA electrician to survey site for electrical installation.
21/08/2014 (Day 233)	Meeting with an EA electrician tendering for the installation work.
25/09/2014 (Day 268)	Installation of ducts for the pneumatic tubes. Additional Aux2 bench mark installed due to wind wall being demolished.
05/11/2014 (Day 309)	Installation of tube protectors.
28/11/2014 (Day 332)	Meeting with electricians during electrical installation. Reported spurious data. Pressure point silting - cleared OK.

Notes on Data Quality
The pier is subsiding. From 2013, Channel 2 was ~60mm low on falling tides - acceptable for monitoring extremes but unacceptable for the purposes of long-term sea level monitoring. The lower pressure point may be silting up due to the port works in the area.

Liverpool – Map & Images of Site



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	0.596	23	09:15:00	1.473	26	14:00:00	-0.125	27	17:45:00	-0.324	26	02:45:00
Feb	1.319	8	13:15:00	2.581	12	18:45:00	0.038	6	14:45:00	-0.415	28	12:15:00
Mar	0.782	20	15:15:00	0.789	20	15:15:00	-0.214	16	08:15:00	-0.363	3	21:00:00
Apr	0.681	6	13:00:00	0.676	6	13:00:00	-0.137	14	15:30:00	-0.187	20	22:00:00
May	0.168	17	22:00:00	0.696	10	16:00:00	-0.208	15	17:15:00	-0.239	23	18:30:00
Jun				0.338	10	18:00:00				-0.172	17	17:30:00
July				0.507	14	20:45:00				-0.117	28	19:00:00
Aug				0.782	10	16:45:00				-0.164	26	11:00:00
Sep				0.303	26	07:15:00				-0.177	12	10:00:00
Oct	1.413	21	04:45:00	1.312	21	04:30:00	-0.101	13	13:15:00	-0.136	29	20:15:00
Nov				0.648	13	19:00:00				-0.171	17	15:30:00
Dec	0.554	17	02:15:00				-0.486	28	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	3.806	22	14:30:00	5.859	3	12:00:00	-2.645	22	21:30:00	-4.086	30	17:30:00
Feb	3.647	6	15:45:00	5.659	1	11:45:00	-1.791	7	11:00:00	-4.486	2	20:00:00
Mar	4.87	31	23:45:00	5.598	2	11:30:00	-4.305	31	18:15:00	-4.602	3	19:30:00
Apr	5.15	1	12:00:00	5.14	1	12:00:00	-4.184	1	19:00:00	-4.19	1	19:00:00
May	4.633	18	01:00:00	4.626	18	01:00:00	-4.044	17	07:15:00	-4.048	17	07:15:00
Jun				4.731	15	00:00:00				-4.235	16	07:45:00
July				5.222	15	00:30:00				-4.393	15	07:45:00
Aug				5.515	13	00:15:00				-4.304	13	07:30:00
Sep				5.395	11	00:00:00				-4.608	10	06:30:00
Oct	4.758	26	12:15:00	5.525	8	22:45:00	-3.525	12	07:45:00	-4.146	10	06:45:00
Nov				5.195	6	22:30:00				-3.735	6	04:45:00
Dec	4.974	23	11:45:00				-4.038	25	20:15:00			

	Mean Sea Level			
	Channel 1		Channel 2	
January	0	*	10	*
February	0	*	28	0.676
March	1	*	29	0.344
April	8	*	30	0.387
May	0	*	31	0.357
June	0	*	30	0.345
July	0	*	31	0.395
August	0	*	31	0.464
September	0	*	29	0.39
October	6	*	20	0.584
November	0	*	26	0.58
December	11	*	0	*
TOTAL & AVG	26	**	295	**

*	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

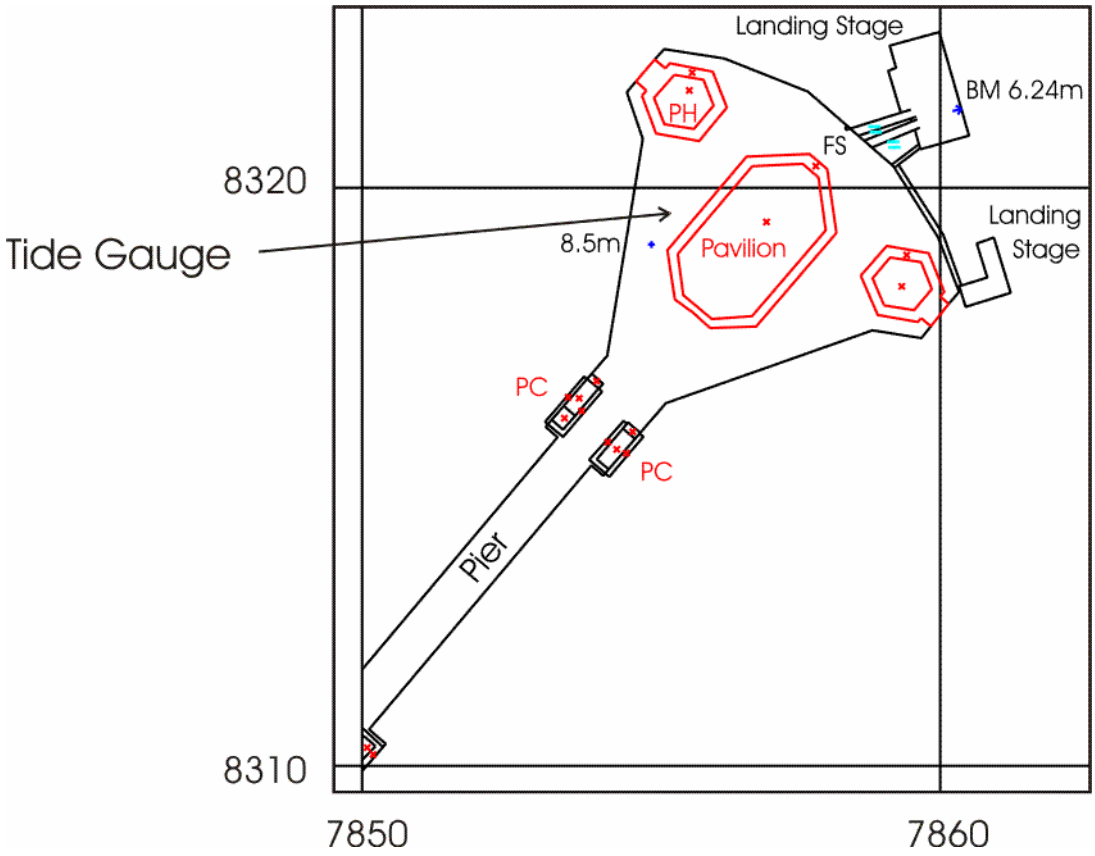
Benchmark Relationships
TGZ = Admiralty Chart Datum (ACD)
TGZ = 3.85m below Ordnance Datum Newlyn (ODN)
TGZ = 12.558m below TGBM

Levelling No levelling was carried out in 2014

Site visits
No site visits were carried out in 2014

Notes on Data Quality
The site met the agreed target of being operational for at least 75% of each calendar month in 2014.

Llandudno – Map & Images of Site



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	1.051	26	13:30:00	1.061	26	13:30:00	-0.38	26	01:15:00	-0.371	26	01:15:00
Feb	1.623	12	17:45:00	1.633	12	17:45:00	-0.453	28	12:00:00	-0.443	28	12:00:00
Mar	0.608	20	14:15:00	0.619	20	14:15:00	-0.37	25	21:30:00	-0.361	25	21:30:00
Apr	0.503	6	11:45:00	0.511	6	11:45:00	-0.262	14	15:45:00	-0.251	14	15:45:00
May	0.463	10	15:15:00	0.473	10	15:15:00	-0.323	23	19:15:00	-0.291	23	17:30:00
Jun	0.207	7	15:45:00	0.215	7	15:45:00	-0.252	17	17:30:00	-0.246	17	17:30:00
July	0.293	4	16:00:00	0.299	4	16:00:00	-0.27	9	10:15:00	-0.257	9	10:15:00
Aug	0.331	29	08:15:00	0.341	29	08:15:00	-0.208	26	09:15:00	-0.186	26	10:00:00
Sep	0.132	24	03:00:00	0.141	24	03:00:00	-0.206	2	01:45:00	-0.198	2	01:45:00
Oct	1.062	21	05:45:00	1.079	21	05:45:00	-0.591	21	20:15:00	-0.578	21	20:15:00
Nov	0.554	13	18:45:00	0.564	13	18:45:00	-0.266	17	14:45:00	-0.248	17	14:45:00
Dec	0.68	9	20:30:00	0.689	9	20:30:00	-0.598	2	08:00:00	-0.577	2	08:00:00

	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	5.07	3	12:00:00	5.081	3	12:00:00	-3.623	30	16:45:00	-3.614	30	16:45:00
Feb	4.881	3	13:00:00	4.891	3	13:00:00	-3.991	2	19:00:00	-3.982	2	19:00:00
Mar	4.803	2	11:15:00	4.811	2	11:15:00	-4.144	3	18:45:00	-4.135	3	18:45:00
Apr	4.317	1	11:30:00	4.326	1	11:30:00	-3.743	1	18:15:00	-3.735	1	18:15:00
May	3.896	18	00:30:00	3.912	18	00:30:00	-3.662	17	06:30:00	-3.654	17	06:30:00
Jun	3.977	14	23:30:00	3.984	14	23:30:00	-3.811	16	07:15:00	-3.801	16	07:15:00
July	4.434	15	00:15:00	4.441	15	00:15:00	-3.994	15	07:00:00	-3.983	15	07:00:00
Aug	4.677	13	00:00:00	4.685	13	00:00:00	-3.963	13	06:45:00	-3.953	13	06:45:00
Sep	4.614	10	23:30:00	4.621	10	23:30:00	-4.073	10	05:30:00	-4.066	10	05:30:00
Oct	4.789	8	22:30:00	4.797	8	22:30:00	-3.669	10	05:45:00	-3.66	10	05:45:00
Nov	4.547	6	22:15:00	4.557	6	22:15:00	-3.331	5	03:15:00	-3.314	5	03:15:00
Dec	4.18	23	11:15:00	4.191	23	11:15:00	-3.703	25	19:30:00	-3.691	25	19:30:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.443	31	0.452
February	28	0.481	28	0.49
March	31	0.161	31	0.171
April	30	0.197	30	0.206
May	31	0.163	31	0.172
June	30	0.152	30	0.16
July	31	0.199	31	0.207
August	31	0.243	31	0.252
September	30	0.215	30	0.223
October	31	0.394	31	0.404
November	30	0.409	30	0.418
December	31	0.227	31	0.238
TOTAL & AVG	365	0.274	365	0.283

*	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

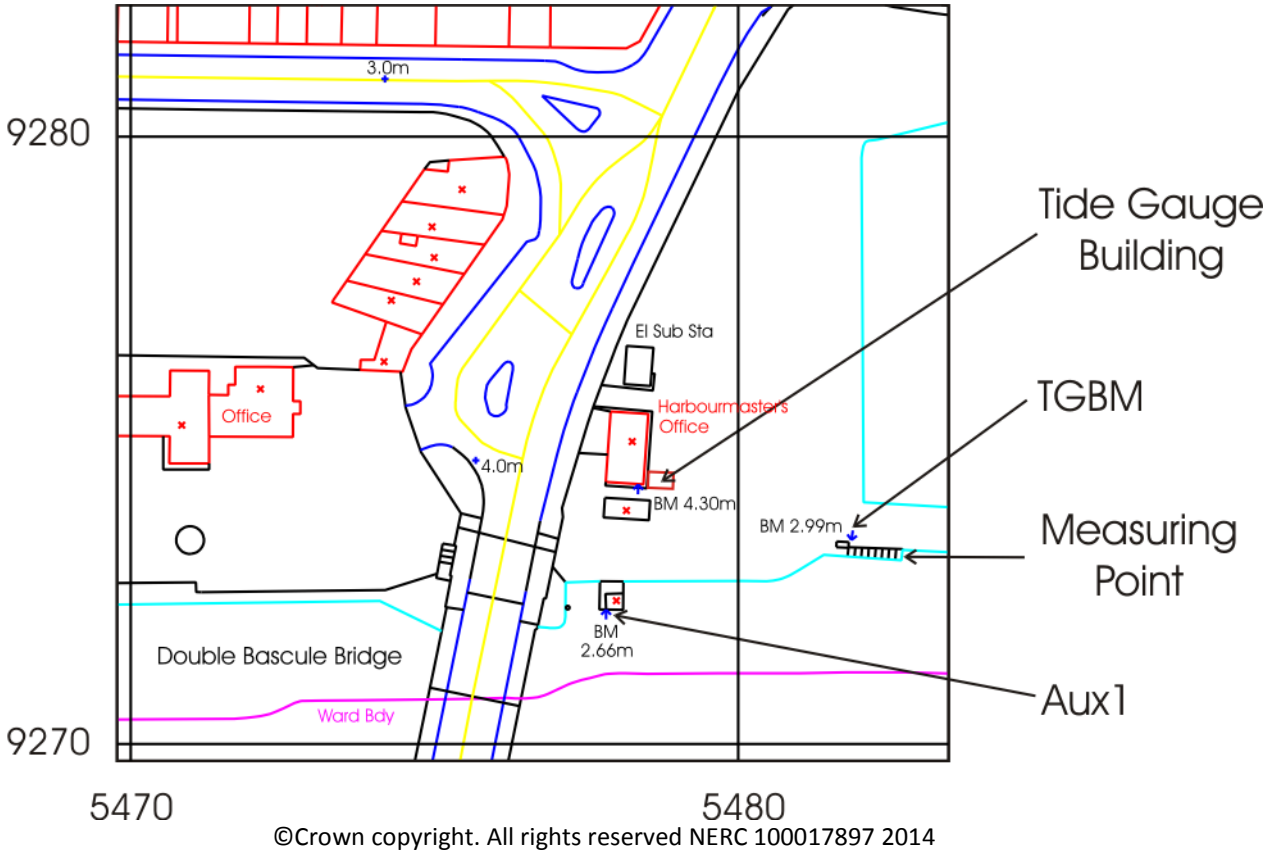
Benchmark Relationships
TGZ = Admiralty Chart Datum (ACD)
TGZ = 1.50m below Ordnance Datum Newlyn (ODN)
TGZ = 4.483m below TGBM

Levelling No levelling was carried out in 2014

Site visits
02/05/2014 (Day 122) Maintenance.
23/11/2014 (Day 327) Maintenance.

Notes on Data Quality
The site met the agreed target of being operational for at least 75% of each calendar month in 2014.

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	0.782	25	23:15:00	0.804	25	23:15:00	-1.03	25	03:45:00	-1.018	25	03:45:00
Feb	0.43	7	12:15:00	0.457	7	12:15:00	-0.896	1	01:30:00	-0.88	1	02:15:00
Mar	1.022	15	04:00:00	1.044	15	04:00:00	-0.734	8	20:30:00	-0.723	8	20:30:00
Apr	0.574	18	04:30:00	0.597	18	04:30:00	-0.321	16	05:15:00	-0.302	16	05:15:00
May	0.314	11	17:15:00	0.333	11	17:15:00	-0.277	15	06:30:00	-0.257	15	06:30:00
Jun	0.355	19	10:15:00	0.379	19	10:15:00	-0.178	12	17:30:00	-0.15	12	17:30:00
July	0.41	9	12:00:00	0.425	9	12:00:00	-0.258	16	19:45:00	-0.237	16	20:00:00
Aug	0.397	18	11:00:00	0.419	18	11:00:00	-0.288	3	23:45:00	-0.271	3	23:45:00
Sep	0.575	26	18:45:00	0.59	26	18:30:00	-0.215	25	12:00:00	-0.202	25	12:00:00
Oct	1.717	22	01:30:00	1.738	22	01:30:00	-0.458	6	18:15:00	-0.437	6	16:00:00
Nov	0.326	15	18:45:00	0.338	15	18:45:00	-0.513	7	04:30:00	-0.508	7	09:15:00
Dec	0.986	10	07:30:00	0.992	10	07:30:00	-1.276	9	22:45:00	-1.259	9	22:45:00

	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	1.601	4	23:30:00	1.619	4	23:30:00	-1.622	6	07:00:00	-1.622	6	07:00:00
Feb	1.345	2	23:00:00	1.361	2	23:00:00	-1.997	1	04:30:00	-1.983	1	04:30:00
Mar	1.436	15	08:15:00	1.455	15	08:15:00	-1.455	3	04:45:00	-1.447	3	04:45:00
Apr	1.46	17	22:45:00	1.484	17	22:45:00	-1.246	16	04:15:00	-1.227	16	04:15:00
May	1.05	17	10:45:00	1.08	17	10:45:00	-1.148	15	03:30:00	-1.129	15	03:30:00
Jun	1.351	19	14:00:00	1.37	19	14:00:00	-1.173	17	19:00:00	-1.155	17	19:00:00
July	1.364	15	11:15:00	1.384	15	11:15:00	-1.351	16	18:45:00	-1.339	16	18:45:00
Aug	1.484	14	11:45:00	1.498	14	11:30:00	-1.285	11	16:15:00	-1.262	11	16:15:00
Sep	1.415	26	22:30:00	1.424	26	22:30:00	-1.232	10	16:30:00	-1.22	10	16:30:00
Oct	1.997	21	20:30:00	2.015	21	20:30:00	-1.251	6	13:45:00	-1.237	6	13:45:00
Nov	1.357	8	09:45:00	1.372	8	09:45:00	-1.339	7	15:45:00	-1.324	7	15:45:00
Dec	1.632	10	11:00:00	1.637	10	11:00:00	-1.303	9	17:45:00	-1.275	9	17:45:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.064	31	0.081
February	28	0.063	28	0.08
March	31	0.105	31	0.124
April	30	0.151	30	0.173
May	31	0.107	31	0.128
June	30	0.151	30	0.17
July	31	0.206	31	0.224
August	31	0.214	31	0.232
September	30	0.23	30	0.245
October	31	0.269	18	0.275
November	30	0.202	27	0.212
December	31	0.278	31	0.29
TOTAL & AVG	365	0.170	349	0.186

*	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

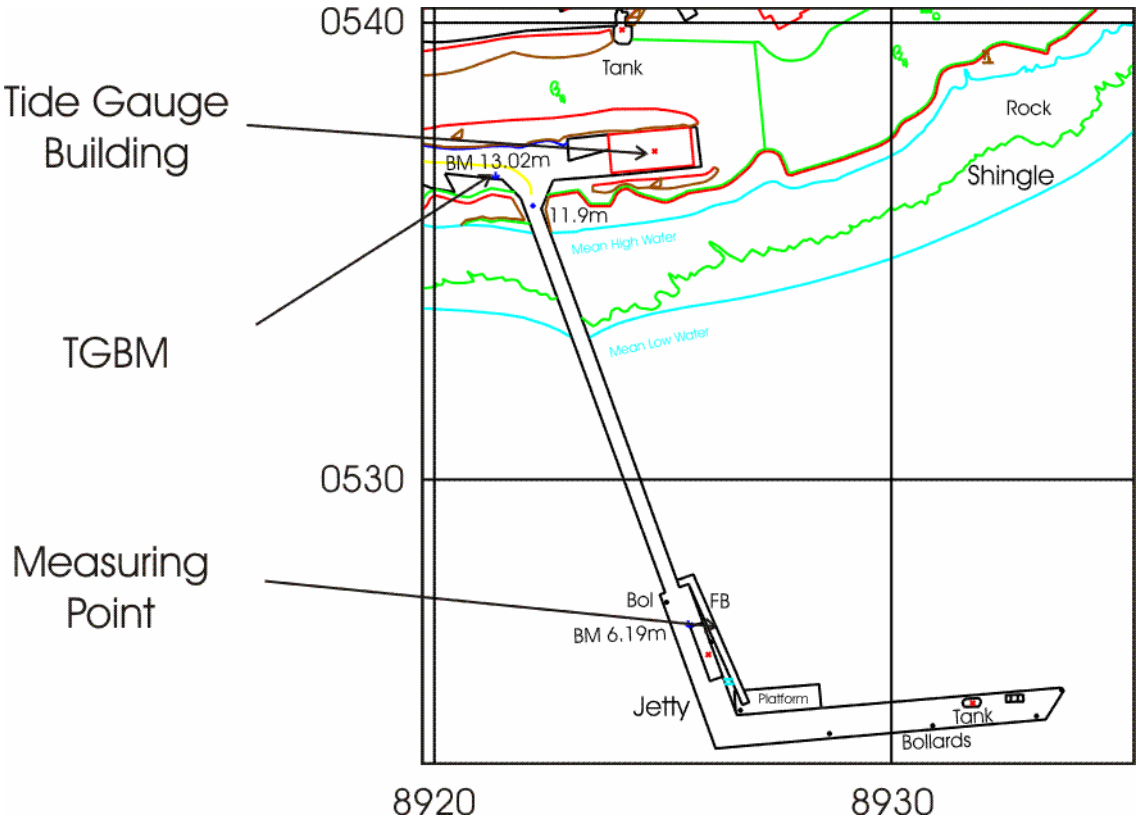
Benchmark Relationships
TGZ = Admiralty Chart Datum (ACD)
TGZ = 3.71m below Ordnance Datum Newlyn (ODN)
TGZ = 16.734m below TGBM

Levelling No levelling was carried out in 2014

Site visits
07/11/2014 (Day 311) 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 2014.

Milford Haven – Map & Images of Site



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	0.81	6	15:15:00	0.786	3	12:45:00	-0.351	25	23:15:00	-0.338	25	23:15:00
Feb	1.548	12	13:00:00	1.53	12	13:00:00	-0.329	28	08:15:00	-0.336	28	08:30:00
Mar	0.639	2	14:45:00	0.658	2	14:45:00	-0.168	15	06:15:00	-0.192	25	19:00:00
Apr	0.547	26	11:15:00	0.545	26	10:30:00	-0.148	14	10:45:00	-0.146	14	10:45:00
May	0.436	10	13:30:00	0.438	10	13:30:00	-0.212	16	12:30:00	-0.211	16	12:30:00
Jun	0.298	6	21:00:00	0.292	6	21:00:00	-0.14	12	04:30:00	-0.137	12	04:30:00
July	0.293	4	11:15:00	0.304	4	11:15:00	-0.132	9	04:15:00	-0.118	9	05:00:00
Aug	0.377	10	01:30:00	0.384	10	01:30:00	-0.067	15	20:00:00	-0.058	15	20:00:00
Sep	0.24	17	20:45:00	0.25	17	20:45:00	-0.124	2	06:30:00	-0.116	2	06:30:00
Oct	0.627	6	00:45:00	0.618	6	00:45:00	-0.286	21	15:30:00	-0.293	21	15:30:00
Nov	0.757	14	03:45:00	0.736	14	02:15:00	-0.1	23	16:00:00	-0.104	23	15:45:00
Dec	0.652	12	00:30:00	0.628	12	00:30:00	-0.332	6	01:45:00	-0.343	27	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	4.561	3	07:15:00	4.106	2	19:00:00	-3.019	4	14:45:00	-2.964	4	02:00:00
Feb	4.461	3	08:30:00	4.433	3	08:30:00	-3.468	2	14:15:00	-3.441	2	14:15:00
Mar	4.411	2	06:45:00	4.42	2	06:45:00	-3.453	3	13:45:00	-3.443	3	14:00:00
Apr	3.868	2	07:45:00	3.862	2	07:45:00	-3.24	1	01:00:00	-3.247	1	01:00:00
May	3.419	1	07:15:00	3.428	1	07:15:00	-3.175	17	01:45:00	-3.168	17	01:45:00
Jun	3.493	15	19:45:00	3.496	15	19:45:00	-3.223	16	02:15:00	-3.22	16	02:15:00
July	3.925	14	19:45:00	3.937	14	19:45:00	-3.364	15	02:00:00	-3.352	15	02:00:00
Aug	4.193	12	19:30:00	4.192	12	19:30:00	-3.469	13	01:45:00	-3.458	13	01:45:00
Sep	4.141	10	19:00:00	4.152	10	19:00:00	-3.525	10	00:45:00	-3.514	10	00:45:00
Oct	4.306	8	18:00:00	4.097	9	18:45:00	-3.116	10	01:00:00	-3.111	10	01:00:00
Nov	4.041	6	17:45:00	4.023	6	17:45:00	-2.796	8	00:30:00	-2.806	8	00:30:00
Dec	3.639	23	06:45:00	3.608	23	06:45:00	-3.122	25	14:45:00	-3.124	25	14:45:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.421	7	*
February	25	0.46	16	0.389
March	24	0.166	29	0.18
April	23	0.206	30	0.226
May	31	0.18	31	0.183
June	30	0.166	30	0.169
July	28	0.185	31	0.197
August	31	0.232	31	0.24
September	30	0.215	30	0.225
October	31	0.363	31	0.364
November	30	0.443	30	0.437
December	31	0.181	31	0.172
TOTAL & AVG	345	0.268	327	0.262

*	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

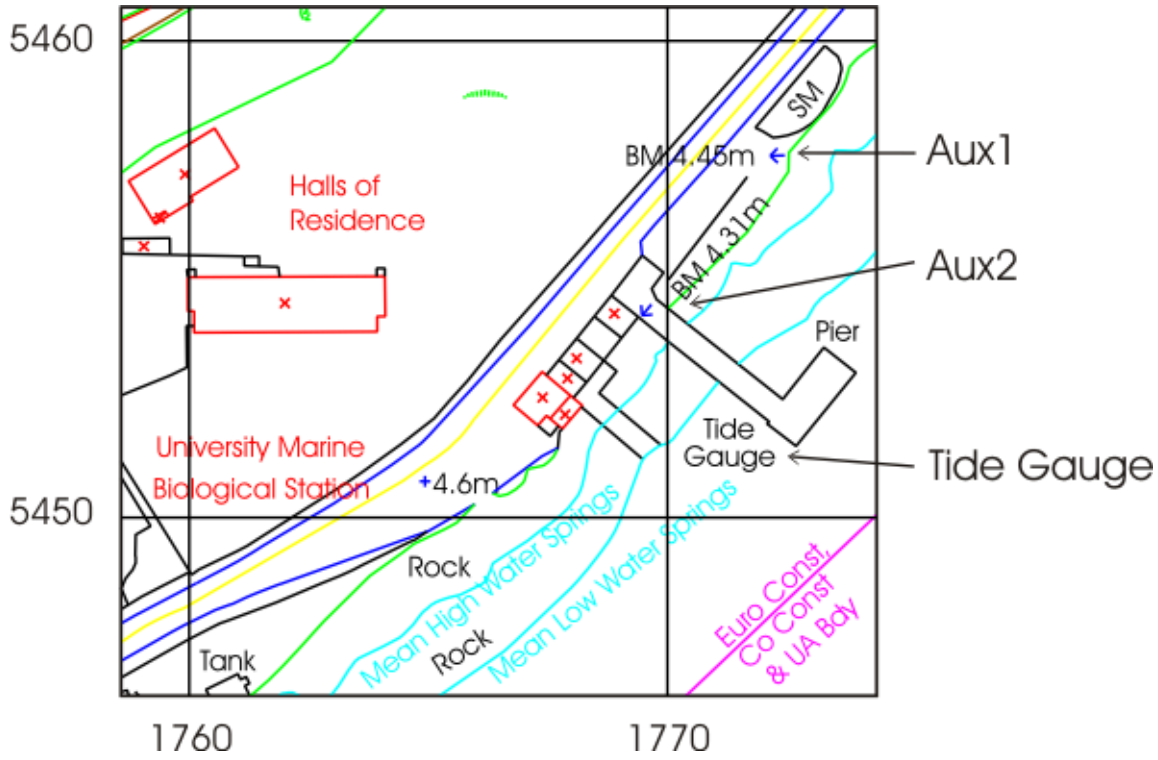
Benchmark Relationships
TGZ = Admiralty Chart Datum (ACD)
TGZ = 1.62m below Ordnance Datum Newlyn (ODN)
TGZ = 7.825m below TGBM

Levelling No levelling was carried out in 2014

Site visits
02/03/2014 (Day 061) Maintenance. Compressor change.
02/07/2014 (Day 183) Maintenance.

Notes on Data Quality
The site met the agreed target of being operational for at least 75% of each calendar month in 2014.

Millport – Map & Images of Site



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	1.327	3	11:30:00	1.323	3	11:30:00	-0.274	26	03:45:00	-0.275	26	03:45:00
Feb	1.401	8	12:15:00	1.399	8	12:15:00	-0.338	28	12:00:00	-0.339	28	12:00:00
Mar	0.749	20	06:30:00	0.741	20	06:30:00	-0.368	25	23:00:00	-0.369	25	23:00:00
Apr	0.634	6	13:30:00	0.632	6	13:30:00	-0.287	14	11:30:00	-0.29	14	11:30:00
May	0.495	10	17:45:00	0.491	10	17:45:00	-0.285	23	20:45:00	-0.288	23	20:45:00
Jun	0.217	7	19:45:00	0.213	7	19:45:00	-0.225	15	14:00:00	-0.229	15	14:00:00
July	0.461	4	09:15:00	0.456	4	09:15:00	-0.277	9	10:30:00	-0.281	9	10:30:00
Aug	0.487	29	06:15:00	0.483	29	06:15:00	-0.238	18	06:15:00	-0.243	18	06:15:00
Sep	0.163	26	04:30:00	0.156	26	04:30:00	-0.219	1	13:15:00	-0.224	1	13:15:00
Oct	1.154	6	06:30:00	1.147	6	06:30:00	-0.443	21	19:45:00	-0.45	21	19:45:00
Nov	0.684	6	18:45:00	0.675	6	18:45:00	-0.206	21	00:00:00	-0.218	21	00:00:00
Dec	0.638	9	16:45:00	0.623	9	16:45:00	-0.607	28	04:45:00	-0.621	28	04:45:00

	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	3.187	3	13:15:00	3.183	3	13:15:00	-1.478	30	17:30:00	-1.479	30	17:30:00
Feb	2.828	3	14:30:00	2.825	3	14:30:00	-1.718	28	17:00:00	-1.719	28	17:00:00
Mar	2.399	20	14:45:00	2.391	20	14:45:00	-1.653	28	16:00:00	-1.654	28	16:00:00
Apr	1.952	5	03:30:00	1.951	5	03:30:00	-1.52	27	16:30:00	-1.523	27	16:30:00
May	1.954	18	02:15:00	1.949	18	02:15:00	-1.488	16	06:30:00	-1.492	16	06:30:00
Jun	1.84	2	02:45:00	1.836	2	02:45:00	-1.718	16	07:45:00	-1.723	16	07:45:00
July	2.069	16	02:45:00	2.065	16	02:45:00	-1.692	15	07:30:00	-1.695	15	07:30:00
Aug	2.167	13	01:45:00	2.162	13	01:45:00	-1.584	14	08:00:00	-1.59	14	08:00:00
Sep	2.017	11	01:30:00	2.012	11	01:30:00	-1.675	10	06:00:00	-1.68	10	06:00:00
Oct	2.32	9	00:15:00	2.312	9	00:15:00	-1.289	7	04:15:00	-1.295	7	04:15:00
Nov	2.565	7	00:00:00	2.558	7	00:00:00	-1.377	5	04:00:00	-1.383	5	04:00:00
Dec	2.496	9	13:45:00	2.486	9	13:45:00	-1.559	27	22:00:00	-1.574	27	22:00:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.664	31	0.663
February	28	0.729	28	0.728
March	31	0.363	31	0.361
April	30	0.354	30	0.351
May	31	0.31	31	0.306
June	30	0.279	30	0.274
July	31	0.336	31	0.332
August	31	0.396	31	0.391
September	30	0.344	30	0.339
October	31	0.593	31	0.587
November	30	0.595	30	0.585
December	31	0.455	31	0.44
TOTAL & AVG	365	0.452	365	0.446

*	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 2014

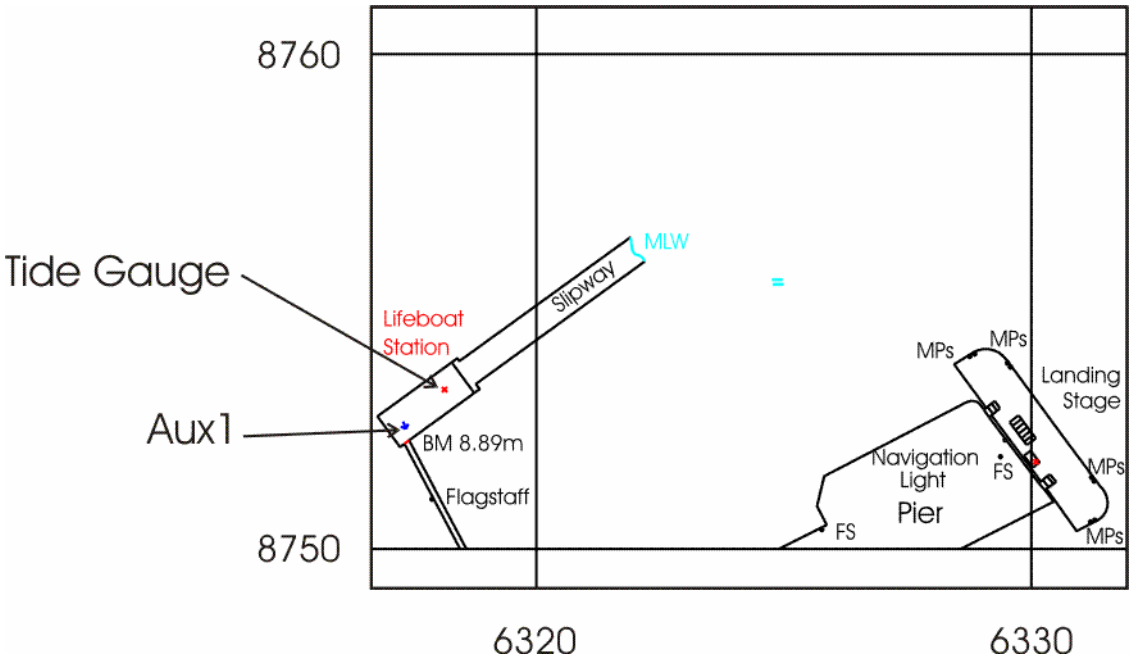
Site visits

18/06/2014 (Day 169)	Maintenance. Investigating power failure to old lifeboat station and survey of new lifeboat station.
07/11/2014 (Day 311)	Maintenance. Survey of old and new lifeboat stations.

Notes on Data Quality
On 30/04/2014 the power supply was turned off to the old Lifeboat station due to contractors undertaking work in the building. Power was restored on 12/05/2014 and failed again on 12/06/2014 when all power to the Lifeboat station was lost. No data has been received since then. This was reported to the electricity company and TGI have visited the site to investigate.

The gauge will be reinstated at the end of Mumbles pier in 2015.

Mumbles – Map & Images of Site



Mumbles – 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	0.957	6	14:00:00	0.949	6	14:00:00	-0.572	25	21:45:00	-0.58	25	21:45:00
Feb	1.304	8	17:30:00	1.295	8	17:30:00	-0.406	28	09:00:00	-0.401	28	09:00:00
Mar	0.64	2	16:00:00	0.634	2	16:00:00	-0.318	16	11:00:00	-0.326	16	11:00:00
Apr	0.518	26	10:45:00	0.51	26	10:45:00	-0.281	14	11:00:00	-0.289	14	11:00:00
May	0.224	25	10:00:00	0.219	25	09:45:00	-0.3	16	12:45:00	-0.304	16	12:45:00
Jun	0.235	6	21:45:00	0.226	6	21:45:00	-0.133	9	05:30:00	-0.141	9	05:30:00
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	5.732	3	07:15:00	5.731	3	07:15:00	-4.172	4	02:00:00	-4.18	4	02:00:00
Feb	5.655	3	08:45:00	5.652	3	08:45:00	-4.645	2	14:15:00	-4.651	2	14:15:00
Mar	5.657	2	06:45:00	5.649	2	06:45:00	-4.589	4	02:00:00	-4.595	4	02:00:00
Apr	5.095	1	07:00:00	5.089	1	07:00:00	-4.398	1	13:15:00	-4.405	1	13:15:00
May	4.507	17	20:00:00	4.499	17	20:00:00	-4.263	16	00:45:00	-4.266	16	00:45:00
Jun	3.733	1	20:30:00	3.724	1	20:30:00	-3.408	1	02:00:00	-3.414	1	02:00:00
July												
Aug												
Sep												
Oct												
Nov												
Dec												

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.444	31	0.436
February	20	0.511	21	0.501
March	31	0.17	31	0.162
April	28	0.211	28	0.202
May	18	0.162	18	0.155
June	8	*	8	*
July	0	*	0	*
August	0	*	0	*
September	0	*	0	*
October	0	*	0	*
November	0	*	0	*
December	0	*	0	*
TOTAL & AVG	136	**	137	**

*	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

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

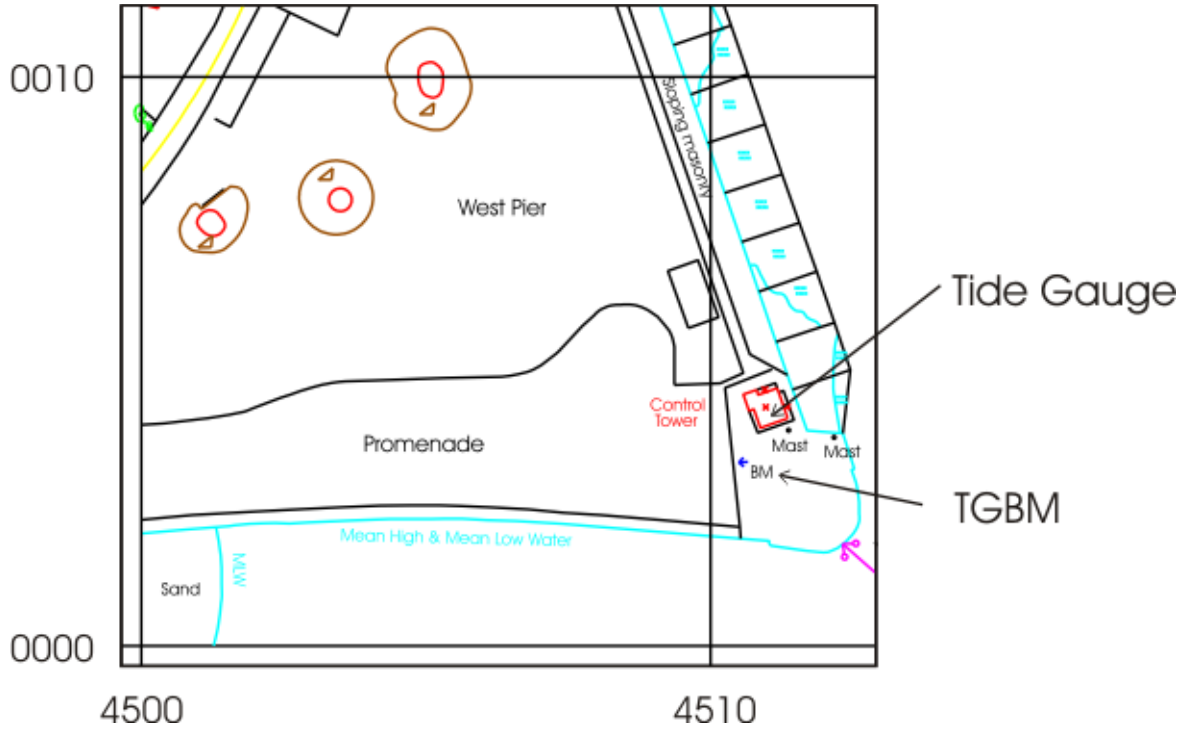
Benchmark Relationships
TGZ = Admiralty Chart Datum (ACD)
TGZ = 3.52m below Ordnance Datum Newlyn (ODN)
TGZ = 8.783m below TGBM

Levelling No levelling was carried out in 2014

Site visits
No site visits were carried out in 2014

Notes on Data Quality
The site met the agreed target of being operational for at least 75% of each calendar month in 2014.

Newhaven – Map & Images of Site



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	0.609	3	18:15:00	0.621	3	16:00:00	-0.436	25	05:45:00	-0.423	25	05:45:00
Feb	1.017	14	21:00:00	1.024	14	21:00:00	-0.492	15	11:15:00	-0.481	6	03:00:00
Mar	0.394	15	10:45:00	0.405	15	10:45:00	-0.436	8	22:45:00	-0.423	8	22:45:00
Apr	0.337	7	15:00:00	0.347	7	15:30:00	-0.289	16	06:15:00	-0.278	16	06:15:00
May	0.343	10	06:15:00	0.348	10	06:15:00	-0.299	15	09:15:00	-0.292	15	09:15:00
Jun	0.218	27	14:00:00	0.226	19	21:45:00	-0.241	17	12:00:00	-0.226	17	12:00:00
July	0.314	5	05:45:00	0.321	5	05:45:00	-0.229	16	12:00:00	-0.223	16	12:00:00
Aug	0.446	10	13:30:00	0.455	10	13:30:00	-0.192	16	13:00:00	-0.179	16	13:00:00
Sep	0.201	27	01:15:00	0.215	27	01:15:00	-0.251	12	11:00:00	-0.238	12	11:00:00
Oct	0.757	22	03:00:00	0.768	22	03:00:00	-0.248	22	20:30:00	-0.238	22	20:30:00
Nov	0.517	3	04:45:00	0.522	3	04:45:00	-0.142	25	10:15:00	-0.135	25	10:15:00
Dec	0.55	10	11:30:00	0.559	10	11:30:00	-0.588	10	01:00:00	-0.578	10	01:00:00

	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	3.813	5	01:45:00	3.828	5	01:45:00	-2.952	30	17:00:00	-2.942	30	17:00:00
Feb	3.713	3	01:15:00	3.729	3	01:15:00	-3.265	2	07:00:00	-3.26	2	07:00:00
Mar	3.785	3	00:00:00	3.795	3	00:00:00	-3.108	1	17:30:00	-3.101	1	17:30:00
Apr	3.563	1	00:00:00	3.574	1	00:00:00	-3.063	1	06:15:00	-3.052	1	06:15:00
May	3.326	1	00:00:00	3.338	1	00:00:00	-3.048	16	06:15:00	-3.039	16	06:15:00
Jun	3.282	15	00:00:00	3.292	15	00:00:00	-3.043	15	06:45:00	-3.034	15	06:45:00
July	3.523	14	12:30:00	3.53	14	12:30:00	-3.157	15	07:15:00	-3.145	15	07:15:00
Aug	3.757	13	13:00:00	3.766	13	13:00:00	-3.148	12	06:15:00	-3.138	12	06:15:00
Sep	3.653	11	12:30:00	3.664	11	12:30:00	-3.211	11	06:45:00	-3.204	11	06:45:00
Oct	3.837	9	11:30:00	3.851	9	11:30:00	-2.965	10	06:15:00	-2.953	10	06:15:00
Nov	3.663	8	11:45:00	3.672	8	11:45:00	-2.831	7	17:30:00	-2.821	7	17:30:00
Dec	3.408	25	13:15:00	3.42	25	13:15:00	-2.895	25	19:45:00	-2.887	25	19:45:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.256	31	0.268
February	28	0.27	26	0.274
March	31	0.091	31	0.101
April	30	0.136	30	0.147
May	31	0.113	31	0.123
June	30	0.111	30	0.12
July	31	0.159	31	0.168
August	31	0.196	31	0.205
September	30	0.171	30	0.18
October	31	0.265	31	0.275
November	28	0.298	30	0.309
December	31	0.178	31	0.188
TOTAL & AVG	363	0.187	363	0.197

*	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

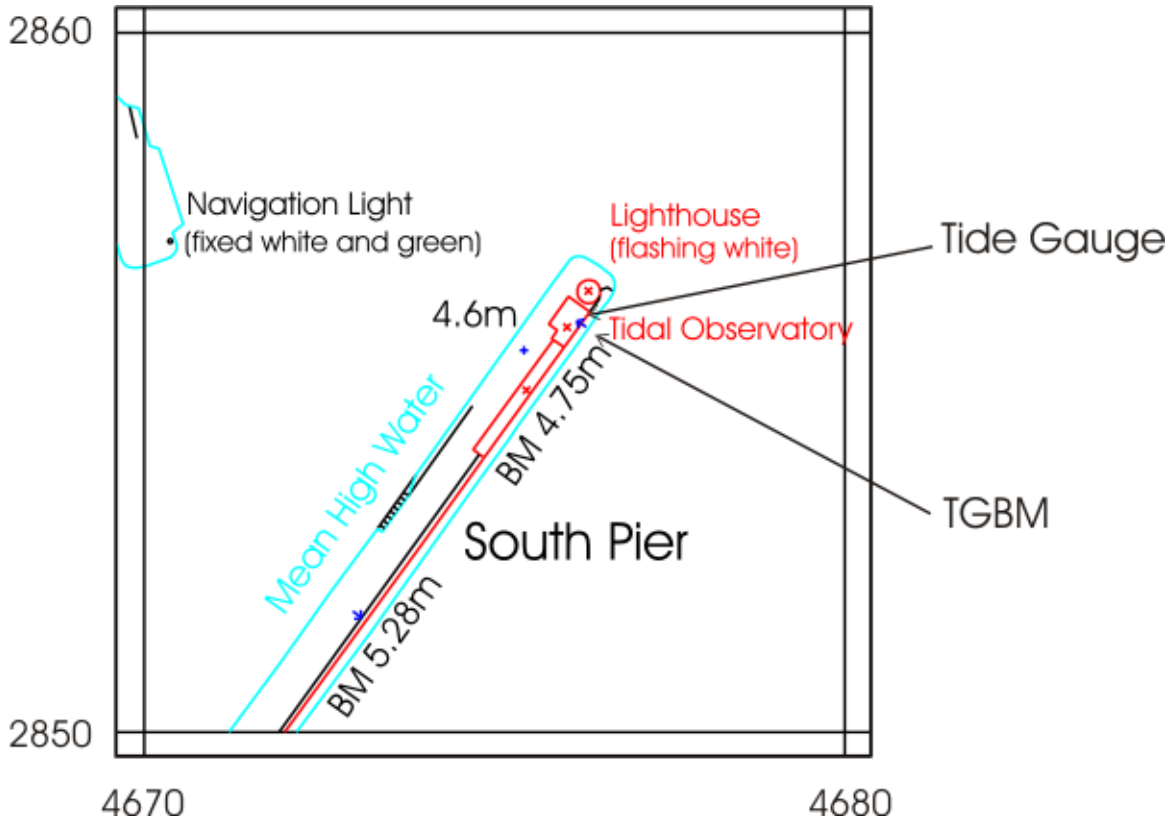
Levelling No levelling was carried out in 2014

Site visits

30/09/2014 (Day 273) Report of power failure and at the same time the float gauge started recording a 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. The gauge will need to be completely refurbished.

Notes on Data Quality
The site met the agreed target of being operational for at least 75% of each calendar month in 2014.

Newlyn – Map & Images of Site



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	0.511	1	08:15:00	0.503	1	07:30:00	-0.293	25	16:00:00	-0.289	25	16:00:00
Feb	0.837	5	02:45:00	0.961	14	17:00:00	-0.194	9	10:45:00	-0.172	28	16:30:00
Mar	0.426	2	11:45:00	0.456	2	14:00:00	-0.255	15	00:30:00	-0.235	15	00:30:00
Apr	0.462	25	21:30:00	0.48	25	21:30:00	-0.138	14	06:30:00	-0.131	14	08:45:00
May	0.279	22	02:45:00	0.286	22	02:45:00	-0.243	15	14:15:00	-0.214	15	14:15:00
Jun	0.261	27	07:15:00	0.274	27	07:15:00	-0.185	12	03:00:00	-0.156	12	03:00:00
July	0.303	18	02:00:00	0.261	4	22:15:00	-0.114	9	01:00:00	-0.107	9	06:15:00
Aug	0.264	10	06:30:00	0.352	10	01:45:00	-0.08	11	04:15:00	-0.089	16	18:00:00
Sep	0.281	17	17:15:00	0.288	17	17:15:00	-0.063	1	14:15:00	-0.108	1	19:00:00
Oct				0.422	17	18:30:00				-0.248	21	16:15:00
Nov				0.642	14	00:30:00				-0.08	23	14:00:00
Dec				0.207	12	00:00:00				-0.376	10	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	3.237	3	06:00:00	3.267	3	06:00:00	-2.376	3	13:00:00	-2.425	3	13:00:00
Feb	3.347	3	07:00:00	3.388	3	07:00:00	-2.729	2	13:15:00	-2.725	2	13:00:00
Mar	2.885	31	04:45:00	3.259	2	05:00:00	-2.768	4	00:45:00	-2.76	4	00:45:00
Apr	2.887	2	06:15:00	2.915	2	06:15:00	-2.486	1	00:00:00	-2.483	1	00:00:00
May	2.509	1	05:45:00	2.533	1	05:45:00	-2.487	17	00:30:00	-2.481	17	00:30:00
Jun	2.427	28	17:30:00	2.611	15	18:15:00	-2.473	15	00:15:00	-2.476	16	01:00:00
July	2.778	13	17:15:00	2.914	14	18:00:00	-2.575	15	01:00:00	-2.563	15	01:00:00
Aug	2.925	11	17:00:00	3.09	12	17:45:00	-2.64	13	00:45:00	-2.631	13	00:45:00
Sep	3.014	9	16:45:00	3.109	10	17:30:00	-2.642	9	23:30:00	-2.626	9	23:30:00
Oct				3.196	8	16:15:00				-2.371	9	23:45:00
Nov				3.031	6	16:00:00				-2.191	7	23:30:00
Dec				2.698	24	05:45:00				-2.422	25	13:45:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.337	31	0.348
February	10	*	15	0.325
March	21	0.112	31	0.141
April	30	0.193	30	0.208
May	31	0.141	31	0.157
June	12	*	30	0.172
July	0	*	27	0.186
August	2	*	31	0.222
September	3	*	27	0.25
October	0	*	31	0.322
November	0	*	30	0.425
December	0	*	31	0.134
TOTAL & AVG	140	**	345	0.241

*	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 2014

Site visits
18/06/2014 (Day 169) Maintenance. Compressor change.

Notes on Data Quality
Channel 2 was ~40mm high and flagged, which was acceptable for monitoring extremes but was flagged as unacceptable for the purposes of long-term sea level monitoring. The backup channel was available throughout. The site met the agreed target of being operational for at least 75% of each calendar month in 2014.

Newport – Map & Images of Site

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	1.031	26	12:45:00	1.465	2	14:15:00	-0.556	25	22:45:00	-0.308	25	05:45:00
Feb				2.287	12	14:15:00				-0.566	28	08:00:00
Mar	0.837	31	14:00:00	1.362	2	14:30:00	-0.609	11	20:30:00	-0.586	11	20:30:00
Apr	0.937	26	12:30:00				-0.47	15	14:15:00			
May	0.893	10	14:00:00				-0.36	30	15:00:00			
Jun	0.756	11	00:30:00				-0.483	16	16:30:00			
July	0.75	16	04:00:00				-0.457	17	05:30:00			
Aug	1.04	13	03:00:00				-0.462	15	05:15:00			
Sep	0.968	11	02:45:00				-0.638	12	04:30:00			
Oct	0.995	10	02:30:00				-0.413	12	16:15:00			
Nov	1.056	14	05:30:00				-0.372	17	20:45:00			
Dec	1.139	12	04:15:00				-0.677	9	03:30:00			

	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	5.028	28	04:15:00	7.298	31	19:30:00	-3.908	24	05:30:00	-5.204	31	02:00:00
Feb				6.751	14	19:00:00				-5.299	28	13:30:00
Mar	7.226	31	07:30:00	7.914	2	07:45:00	-5.489	19	03:30:00	-5.357	1	14:30:00
Apr	7.229	1	08:00:00				-5.48	2	03:45:00			
May	6.495	1	08:15:00				-5.267	1	03:00:00			
Jun	6.71	14	20:00:00				-5.444	16	04:15:00			
July	7.008	15	21:15:00				-5.475	17	05:30:00			
Aug	7.062	10	18:30:00				-5.639	13	16:15:00			
Sep	7.042	9	18:45:00				-5.65	11	16:00:00			
Oct	7.053	7	18:15:00				-5.287	9	14:45:00			
Nov	7.096	6	18:30:00				-5.225	24	15:00:00			
Dec	6.795	23	07:45:00				-5.422	25	16:30:00			

	Mean Sea Level			
	Channel 1		Channel 2	
January	3	*	19	0.577
February	0	*	18	0.661
March	19	0.394	11	*
April	30	0.429	0	*
May	31	0.415	0	*
June	29	0.356	0	*
July	31	0.389	0	*
August	31	0.462	0	*
September	25	0.393	0	*
October	31	0.563	0	*
November	30	0.581	0	*
December	31	0.42	0	*
TOTAL & AVG	291	**	48	**

*	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

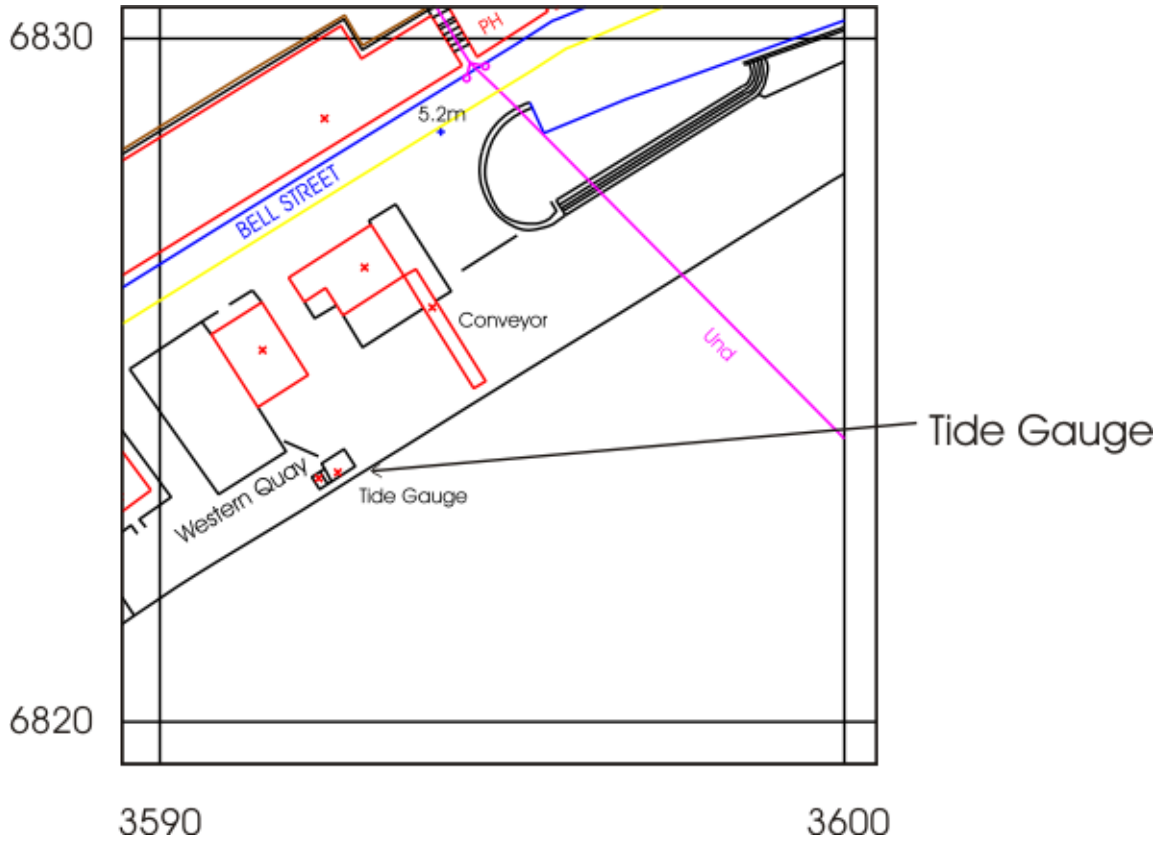
Benchmark Relationships
TGZ = Admiralty Chart Datum (ACD)
TGZ = 2.60m below Ordnance Datum Newlyn (ODN)
TGZ = 6.754m below TGBM

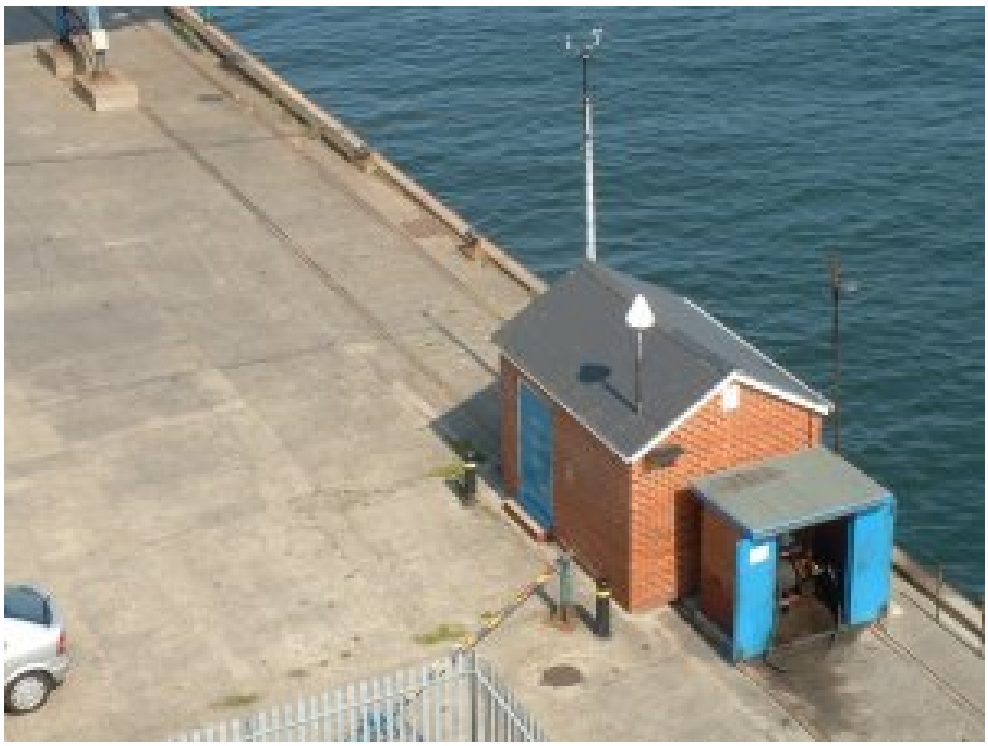
Levelling No levelling was carried out in 2014

Site visits
15/05/2014 (Day 135) Maintenance. Meeting with electrical inspectors at site.

Notes on Data Quality
The site met the agreed target of being operational for at least 75% of each calendar month in 2014.

North Shields – Map & Images of Site





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	0.58	4	13:30:00	0.573	4	13:30:00	-0.731	24	21:00:00	-0.739	24	21:00:00
Feb	0.449	24	06:45:00	0.44	24	06:45:00	-0.604	13	00:00:00	-0.611	13	00:00:00
Mar	0.817	14	23:30:00	0.806	14	23:30:00	-0.611	8	15:30:00	-0.621	8	15:30:00
Apr	0.483	12	23:15:00	0.474	12	23:15:00	-0.24	15	19:15:00	-0.236	15	20:15:00
May	0.354	6	19:45:00	0.319	11	12:15:00	-0.234	14	19:15:00	-0.235	14	19:15:00
Jun	0.263	19	05:30:00	0.263	19	06:00:00	-0.153	17	09:00:00	-0.15	17	09:00:00
July	0.331	5	01:45:00	0.331	5	01:45:00	-0.143	16	17:15:00	-0.142	16	17:15:00
Aug	0.368	9	22:00:00	0.369	9	22:00:00	-0.244	3	18:30:00	-0.243	3	18:30:00
Sep	0.475	26	12:00:00	0.478	26	12:00:00	-0.194	13	17:30:00	-0.193	13	17:30:00
Oct	0.929	21	18:45:00	0.931	21	18:45:00	-0.276	22	16:30:00	-0.275	22	16:30:00
Nov	0.33	2	19:00:00	0.333	2	19:00:00	-0.316	6	17:15:00	-0.313	6	17:15:00
Dec	0.731	10	02:30:00	0.734	10	02:30:00	-0.805	9	16:15:00	-0.802	9	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	3.32	4	17:15:00	3.315	4	17:15:00	-2.755	31	22:15:00	-2.762	31	22:15:00
Feb	3.086	2	17:00:00	3.079	2	17:00:00	-2.678	1	23:00:00	-2.683	1	23:00:00
Mar	3.028	2	16:00:00	3.02	2	16:00:00	-2.46	1	22:00:00	-2.469	1	22:00:00
Apr	2.818	1	16:30:00	2.809	1	16:30:00	-2.159	15	21:45:00	-2.159	15	22:00:00
May	2.574	17	04:45:00	2.565	17	04:45:00	-2.083	14	21:30:00	-2.089	14	21:30:00
Jun	2.606	16	05:15:00	2.608	16	05:15:00	-2.232	15	11:00:00	-2.232	15	11:00:00
July	2.915	15	05:00:00	2.917	15	05:00:00	-2.357	16	12:30:00	-2.355	16	12:30:00
Aug	3.13	13	04:30:00	3.132	13	04:30:00	-2.465	12	10:30:00	-2.462	12	10:30:00
Sep	3.08	10	03:30:00	3.082	10	03:30:00	-2.514	11	11:00:00	-2.511	11	11:00:00
Oct	3.177	10	04:00:00	3.179	10	04:00:00	-2.152	9	09:45:00	-2.15	9	09:45:00
Nov	2.922	8	03:45:00	2.925	8	03:45:00	-2.063	6	09:00:00	-2.059	6	09:00:00
Dec	2.935	23	16:00:00	2.939	23	16:00:00	-2.182	26	00:15:00	-2.179	26	00:15:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	29	0.391	31	0.373
February	28	0.42	28	0.412
March	31	0.334	31	0.325
April	30	0.341	26	0.331
May	31	0.309	24	0.274
June	30	0.322	30	0.32
July	31	0.364	31	0.366
August	31	0.394	31	0.396
September	30	0.388	30	0.39
October	31	0.507	31	0.509
November	30	0.459	30	0.462
December	31	0.459	31	0.463
TOTAL & AVG	363	0.391	354	0.385

*	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

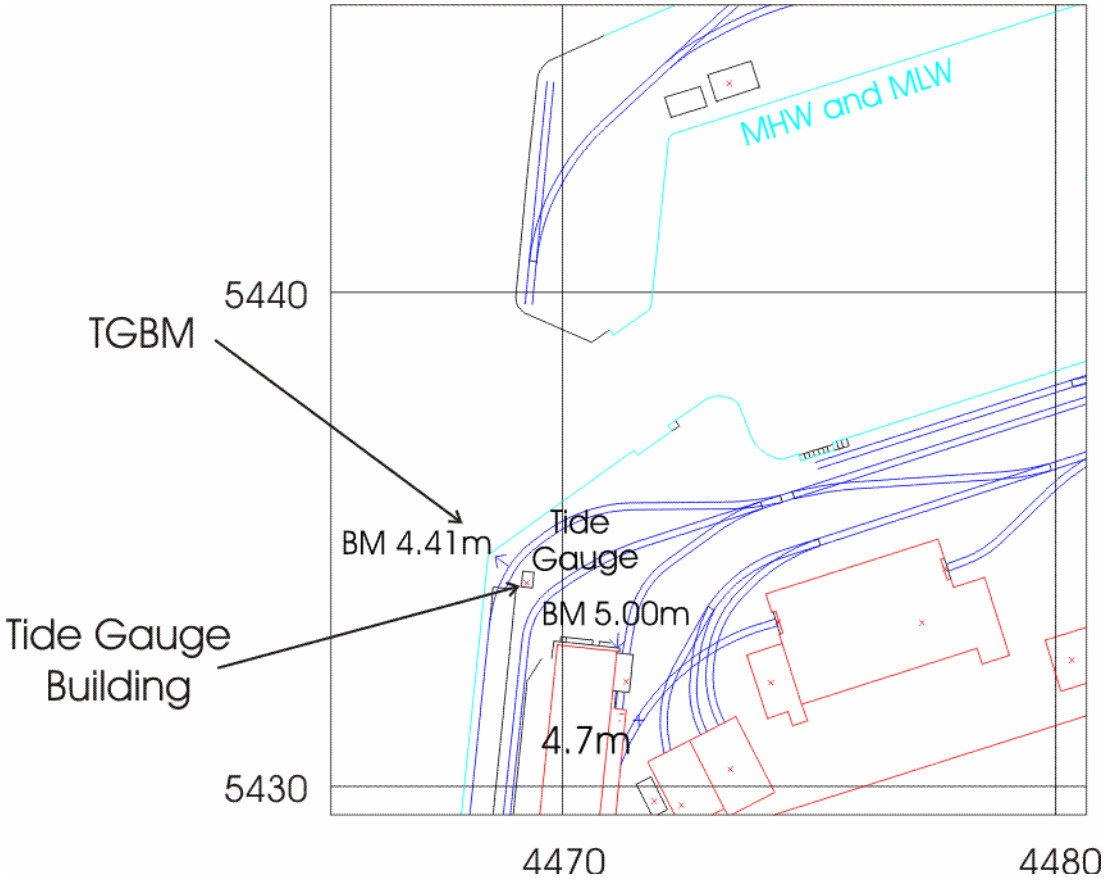
Benchmark Relationships
TGZ = Admiralty Chart Datum (ACD)
TGZ = 3.22m below ODN
TGZ = 7.631m below TGBM

Levelling No levelling was carried out in 2014

Site visits
14/01/2014 (Day 014) 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 2014.

Plymouth Devonport – Map & Images of Site



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	0.637	1	13:00:00	0.629	1	13:00:00	-0.274	25	09:15:00	-0.279	25	09:15:00
Feb	1.087	14	17:45:00	1.082	14	17:45:00	-0.191	28	17:15:00	-0.195	28	17:15:00
Mar	0.434	2	15:45:00	0.425	2	15:45:00	-0.258	15	00:15:00	-0.262	15	00:15:00
Apr	0.453	26	10:15:00	0.447	26	10:15:00	-0.161	16	02:00:00	-0.166	16	02:00:00
May	0.283	22	02:45:00	0.28	22	02:45:00	-0.24	15	10:00:00	-0.246	15	15:00:00
Jun	0.257	27	06:15:00	0.255	27	06:15:00	-0.19	17	08:00:00	-0.195	17	08:00:00
July	0.301	18	01:15:00	0.297	18	01:15:00	-0.125	17	08:45:00	-0.131	17	08:45:00
Aug	0.356	10	08:30:00	0.352	10	08:30:00	-0.088	16	18:30:00	-0.096	16	18:30:00
Sep	0.26	19	01:45:00	0.257	19	01:45:00	-0.137	1	18:45:00	-0.142	1	18:45:00
Oct	0.458	8	21:30:00	0.453	8	21:30:00	-0.262	21	14:45:00	-0.267	21	14:45:00
Nov	0.784	13	11:00:00	0.78	13	11:00:00	-0.095	23	15:00:00	-0.105	23	15:00:00
Dec	0.281	12	02:45:00	0.276	12	02:45:00	-0.393	10	05:15:00	-0.399	10	05:15:00

	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	3.112	3	06:45:00	3.106	3	06:45:00	-2.423	3	13:00:00	-2.433	3	13:15:00
Feb	3.154	3	08:15:00	3.149	3	08:15:00	-2.913	2	13:45:00	-2.92	2	13:45:00
Mar	3.077	3	07:00:00	3.069	3	07:00:00	-2.914	4	01:45:00	-2.921	4	01:45:00
Apr	2.688	2	07:15:00	2.681	2	07:15:00	-2.74	1	00:45:00	-2.745	1	00:45:00
May	2.338	1	07:00:00	2.334	1	07:00:00	-2.729	17	01:15:00	-2.733	17	01:15:00
Jun	2.42	14	18:45:00	2.414	14	18:45:00	-2.696	16	01:45:00	-2.7	16	01:45:00
July	2.681	14	19:15:00	2.673	14	19:15:00	-2.809	15	01:45:00	-2.814	15	01:45:00
Aug	2.856	12	19:00:00	2.846	12	19:00:00	-2.886	13	01:30:00	-2.891	13	01:30:00
Sep	2.826	10	18:45:00	2.816	10	18:45:00	-2.927	11	01:15:00	-2.932	11	01:15:00
Oct	2.999	8	17:45:00	2.989	8	17:45:00	-2.63	10	00:45:00	-2.634	10	00:45:00
Nov	2.835	6	17:15:00	2.825	6	17:15:00	-2.379	8	00:15:00	-2.384	8	00:15:00
Dec	2.533	24	07:00:00	2.524	24	07:00:00	-2.604	24	13:15:00	-2.608	24	13:15:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.393	31	0.387
February	19	0.341	17	0.326
March	31	0.158	31	0.153
April	30	0.213	30	0.208
May	31	0.17	31	0.166
June	30	0.175	30	0.171
July	31	0.196	31	0.191
August	31	0.23	31	0.226
September	30	0.238	30	0.234
October	31	0.331	31	0.326
November	30	0.435	30	0.43
December	31	0.167	31	0.163
TOTAL & AVG	356	0.254	354	0.248

*	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

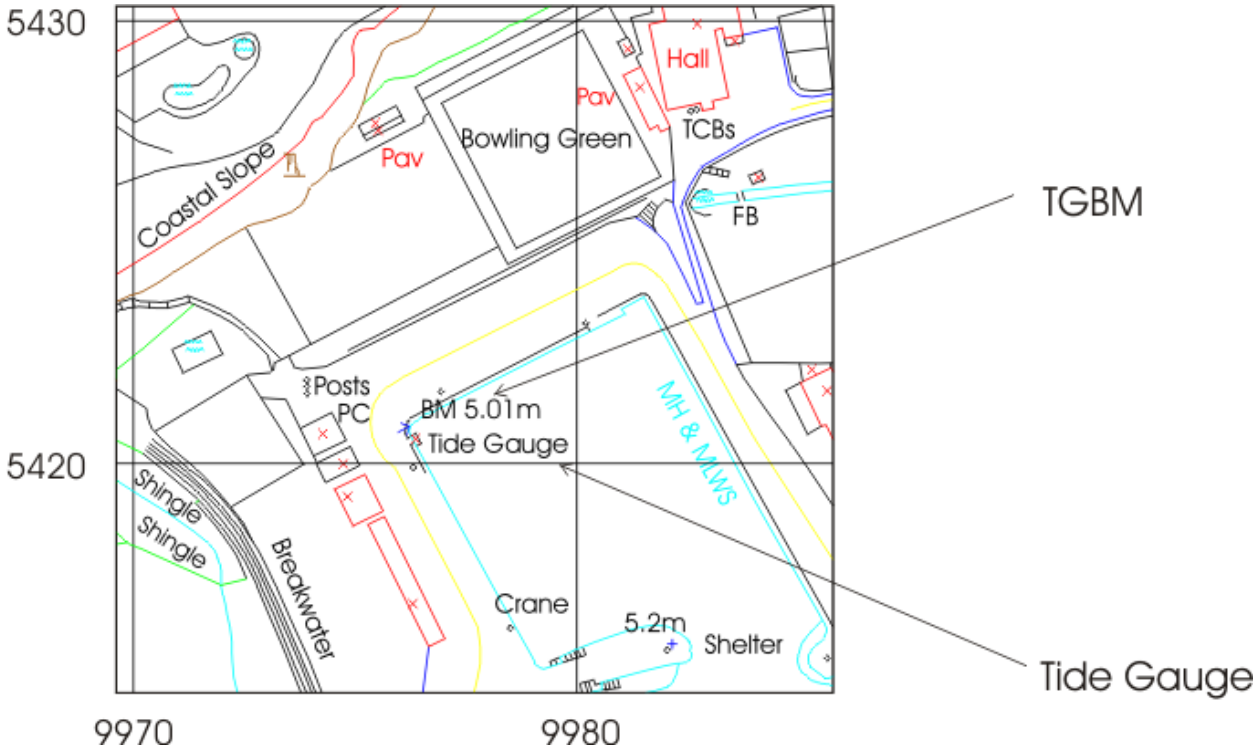
Benchmark Relationships
TGZ = Admiralty Chart Datum (ACD)
TGZ = 1.80m below Ordnance Datum Newlyn (ODN)
TGZ = 6.827m below TGBM

Levelling No levelling was carried out in 2014

Site visits
01/03/2014 (Day 060) Maintenance. Levelling. Compressor change. Calibration of the float gauge.
03/03/2014 (Day 062) Repair of faulty flow regulator.

Notes on Data Quality
Channel 1 was ~70mm low and has been flagged. TGI were on site in March to calibrate the float gauge. The site met the agreed target of being operational for at least 75% of each calendar month in 2014.

Portpatrick – Map & Images of Site



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				1.095	3	10:15:00				-0.156	30	00:30:00
Feb				1.341	8	13:45:00				-0.327	28	13:00:00
Mar				0.675	20	09:15:00				-0.345	25	21:30:00
Apr				0.605	6	12:30:00				-0.185	14	18:15:00
May				0.476	10	16:45:00				-0.223	23	21:00:00
Jun				0.193	10	19:15:00				-0.221	17	17:00:00
July				0.384	4	10:15:00				-0.217	9	10:00:00
Aug				0.411	29	07:30:00				-0.142	18	06:15:00
Sep				0.119	30	17:15:00				-0.167	1	12:30:00
Oct				0.981	6	05:45:00				-0.384	21	21:00:00
Nov				0.652	6	17:30:00				-0.174	5	11:00:00
Dec				0.595	9	16:45:00				-0.559	28	03:15:00

	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				3.48	3	12:30:00				-1.563	30	17:00:00
Feb				3.16	1	12:30:00				-1.867	28	16:45:00
Mar				2.602	20	13:30:00				-1.777	3	19:15:00
Apr				2.316	2	13:15:00				-1.614	27	16:15:00
May				2.218	18	01:30:00				-1.639	17	07:00:00
Jun				2.094	27	23:45:00				-1.813	16	07:30:00
July				2.427	15	01:00:00				-1.818	15	07:30:00
Aug				2.55	13	00:45:00				-1.732	13	07:00:00
Sep				2.441	11	00:30:00				-1.807	10	06:00:00
Oct				2.757	8	23:15:00				-1.417	10	06:15:00
Nov				2.856	6	23:15:00				-1.457	5	03:45:00
Dec				2.578	9	13:15:00				-1.677	25	20:00:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	0	*	24	0.692
February	0	*	28	0.705
March	0	*	28	0.336
April	0	*	30	0.361
May	0	*	31	0.322
June	0	*	30	0.299
July	0	*	31	0.353
August	0	*	31	0.41
September	0	*	30	0.366
October	0	*	31	0.595
November	0	*	30	0.606
December	0	*	31	0.436
TOTAL & AVG	**0**	**	355	0.457

*	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 2014

Site visits
13/05/2014 (Day 133) Maintenance. Compressor change.
13/08/2014 (Day 225) Maintenance and inspection dive.

Notes on Data Quality
The lower quality index is due to a feature of the near real time quality control algorithm. The algorithm requires 2 hours of data either side of high water, which due to the position of the mid tide at Portrush, is not always available, giving an erroneous impression of the data quality. The algorithm is being refined to perform better at these sites. The data inspected in delayed mode reveal no issues.

Portrush – Map & Images of Site

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	0.99	3	12:15:00	0.997	3	12:15:00	-0.223	28	14:30:00	-0.212	28	14:30:00
Feb	0.961	8	13:00:00	0.971	8	13:00:00	-0.165	28	18:45:00	-0.171	28	18:45:00
Mar	0.512	8	17:30:00	0.504	8	17:30:00	-0.271	10	11:15:00	-0.298	26	12:45:00
Apr	0.466	6	14:00:00	0.469	6	14:00:00	-0.219	14	11:45:00	-0.238	14	11:45:00
May	0.339	5	18:45:00	0.342	5	18:45:00	-0.251	23	21:00:00	-0.242	23	21:00:00
Jun	0.109	7	12:45:00	0.116	7	12:45:00	-0.253	16	15:00:00	-0.24	17	13:15:00
July	0.315	4	09:45:00	0.056	31	18:15:00	-0.28	9	09:15:00	-0.134	28	22:30:00
Aug	1.177	13	12:30:00	0.4	29	06:30:00	-0.182	26	21:30:00	-0.166	18	13:45:00
Sep	0.152	26	03:30:00	0.043	1	00:30:00	-0.181	20	18:00:00	-0.164	6	09:15:00
Oct	0.768	21	02:15:00				-0.249	21	22:30:00			
Nov	0.512	6	17:30:00				-0.145	26	02:30:00			
Dec	0.524	10	06:45:00	0.52	10	06:45:00	-0.495	28	03:15:00	-0.538	28	03:15:00

	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	1.973	3	08:00:00	1.985	3	08:00:00	-0.961	29	23:30:00	-0.97	29	23:30:00
Feb	1.67	1	07:15:00	1.68	1	07:15:00	-1.074	28	23:45:00	-1.083	28	23:45:00
Mar	1.498	3	07:45:00	1.487	3	07:45:00	-1.094	31	00:15:00	-1.101	31	00:15:00
Apr	1.16	1	07:15:00	1.154	1	07:15:00	-1.005	1	01:00:00	-1.002	1	01:00:00
May	0.97	17	20:15:00	0.979	17	20:15:00	-1.032	15	12:45:00	-1.041	15	12:45:00
Jun	0.888	13	18:45:00	0.9	14	19:15:00	-1.118	15	13:45:00	-1.11	15	13:45:00
July	1.317	14	19:45:00	0.827	27	19:00:00	-1.081	15	14:15:00	-0.854	28	13:15:00
Aug	1.444	11	19:00:00	1.206	13	20:15:00	-1.086	13	14:00:00	-1.074	13	14:00:00
Sep	1.283	9	18:30:00	1.231	8	17:45:00	-1.205	10	12:45:00	-1.065	9	11:30:00
Oct	1.535	8	18:15:00				-0.892	9	12:45:00			
Nov	1.631	6	17:45:00				-0.822	5	11:00:00			
Dec	1.222	24	07:45:00	1.243	22	06:15:00	-0.957	26	03:00:00	-0.98	26	02:45:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	14	*	31	0.274
February	23	0.276	28	0.287
March	21	0.047	31	0.003
April	30	0.018	30	0.014
May	31	-0.032	31	-0.029
June	30	-0.058	19	-0.06
July	31	0.005	8	*
August	31	0.051	23	0.05
September	30	0.023	8	*
October	31	0.238	0	*
November	30	0.24	0	*
December	31	0.099	21	0.093
TOTAL & AVG	333	0.100	230	**

*	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

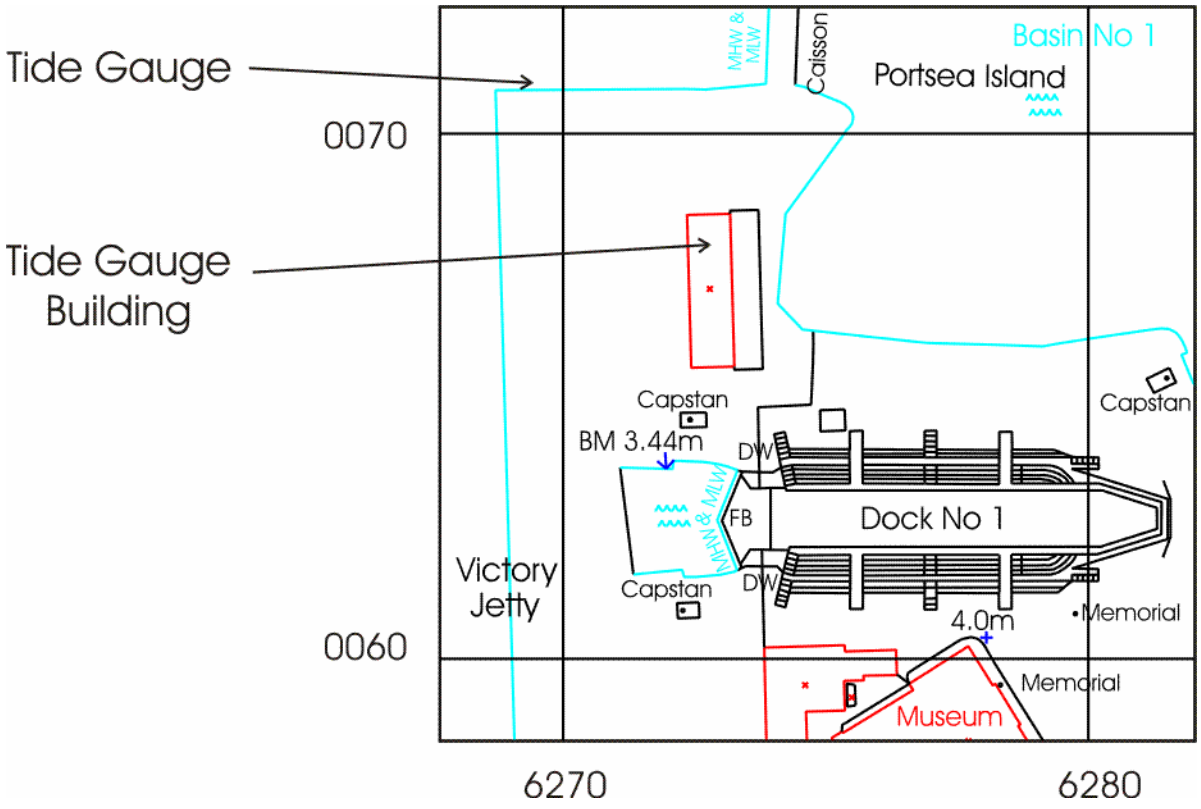
Benchmark Relationships
TGZ = Admiralty Chart Datum (ACD)
TGZ = 2.73m below Ordnance Datum Newlyn (ODN)
TGZ = 6.007m below TGBM

Levelling No levelling was carried out in 2014

Site visits
16/01/2014 (Day 016) 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 2014.

Portsmouth – Map & Images of Site



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	0.796	1	16:30:00	0.813	1	16:30:00	-0.421	25	13:00:00	-0.407	25	13:00:00
Feb	1.194	14	22:00:00	1.213	14	22:00:00	-0.434	6	04:15:00	-0.419	6	04:15:00
Mar	0.459	2	16:15:00	0.475	2	16:15:00	-0.351	9	00:30:00	-0.337	9	00:30:00
Apr	0.421	26	04:00:00	0.436	26	04:00:00	-0.253	16	05:30:00	-0.237	16	05:30:00
May	0.384	23	05:45:00	0.398	23	05:45:00	-0.258	15	06:15:00	-0.244	15	06:15:00
Jun	0.261	7	01:00:00	0.274	7	01:00:00	-0.195	17	07:45:00	-0.181	17	07:45:00
July	0.284	5	03:45:00	0.299	5	03:45:00	-0.243	16	15:30:00	-0.229	16	15:30:00
Aug	0.444	10	11:00:00	0.458	10	11:00:00	-0.162	16	16:30:00	-0.149	16	16:30:00
Sep	0.207	27	02:30:00	0.222	27	02:30:00	-0.223	12	07:15:00	-0.21	12	07:15:00
Oct	0.573	22	06:15:00	0.588	22	06:15:00	-0.216	5	13:15:00	-0.202	5	13:15:00
Nov	0.455	4	00:00:00	0.47	12	08:00:00	-0.19	14	17:15:00	-0.175	14	17:15:00
Dec	0.565	10	15:00:00	0.58	10	15:00:00	-0.574	10	02:45:00	-0.56	10	02:45:00

	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	2.744	3	12:30:00	2.763	3	12:30:00	-2.112	30	16:15:00	-2.097	30	16:15:00
Feb	2.786	14	23:00:00	2.807	14	23:00:00	-2.392	2	18:30:00	-2.377	2	18:30:00
Mar	2.546	3	00:15:00	2.562	3	00:15:00	-2.326	1	16:45:00	-2.311	1	16:45:00
Apr	2.278	2	00:45:00	2.293	2	00:45:00	-2.261	1	05:15:00	-2.247	1	05:15:00
May	2.134	1	00:15:00	2.148	1	00:15:00	-2.326	17	06:00:00	-2.313	17	06:00:00
Jun	2.03	15	00:15:00	2.043	15	00:15:00	-2.313	15	05:45:00	-2.301	15	05:45:00
July	2.24	14	00:00:00	2.253	14	00:00:00	-2.355	15	06:15:00	-2.34	15	06:15:00
Aug	2.473	10	10:45:00	2.49	10	10:45:00	-2.356	13	06:00:00	-2.341	13	06:00:00
Sep	2.271	9	11:15:00	2.285	9	11:15:00	-2.496	11	05:45:00	-2.474	11	05:45:00
Oct	2.618	9	11:30:00	2.635	9	11:30:00	-2.106	10	05:15:00	-2.091	10	05:15:00
Nov	2.575	8	12:00:00	2.593	8	12:00:00	-2.027	24	17:30:00	-2.013	24	17:30:00
Dec	2.328	10	13:30:00	2.343	10	13:30:00	-2.177	25	19:00:00	-2.164	25	19:00:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.306	31	0.32
February	28	0.32	28	0.335
March	31	0.117	31	0.132
April	30	0.165	30	0.18
May	31	0.137	31	0.151
June	30	0.134	30	0.147
July	31	0.175	31	0.189
August	31	0.212	31	0.226
September	30	0.194	30	0.209
October	31	0.286	31	0.3
November	30	0.342	30	0.356
December	31	0.167	31	0.181
TOTAL & AVG	365	0.213	365	0.227

*	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 2014

Site visits

30/07/2014 (Day 211)	Maintenance. Diving to clear completely blocked channel. Channel not fully cleared, may require the pressure points to be lifted.
22/11/2014 (Day 326)	Maintenance.
16/12/2014 (Day 350)	Compressor change. Attempt made to clear the blocked line - still much reduced flow.

Notes on Data Quality
Channel 2 was blocking and several attempts, including diving on site, were made to clear the channel. The site met the agreed target of being operational for at least 75% of each calendar month in 2014.

Sheerness – Map & Images of Site

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	0.553	5	01:15:00				-1.189	3	22:00:00			
Feb	0.583	7	16:45:00				-1.166	6	00:30:00			
Mar												
Apr												
May												
Jun												
July												
Aug												
Sep												
Oct	1.433	22	03:30:00				-0.391	23	06:30:00			
Nov	0.501	30	23:30:00				-0.923	7	09:00:00			
Dec	1.519	10	10:30:00				-1.845	9	23:45:00			

	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	3.514	4	14:30:00				-2.865	6	10:30:00			
Feb	2.935	5	03:45:00				-2.523	5	23:00:00			
Mar												
Apr												
May												
Jun												
July												
Aug												
Sep												
Oct	3.088	25	01:00:00				-2.319	25	19:45:00			
Nov	3.215	8	13:00:00				-2.753	7	19:15:00			
Dec	3.313	24	13:45:00				-2.789	9	21:00:00			

	Mean Sea Level			
	Channel 1		Channel 2	
January	6	*	0	*
February	0	*	0	*
March	0	*	0	*
April	0	*	0	*
May	0	*	0	*
June	0	*	0	*
July	0	*	0	*
August	0	*	0	*
September	0	*	0	*
October	9	*	0	*
November	30	0.217	0	*
December	31	0.227	0	*
TOTAL & AVG	**76**	**	**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

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

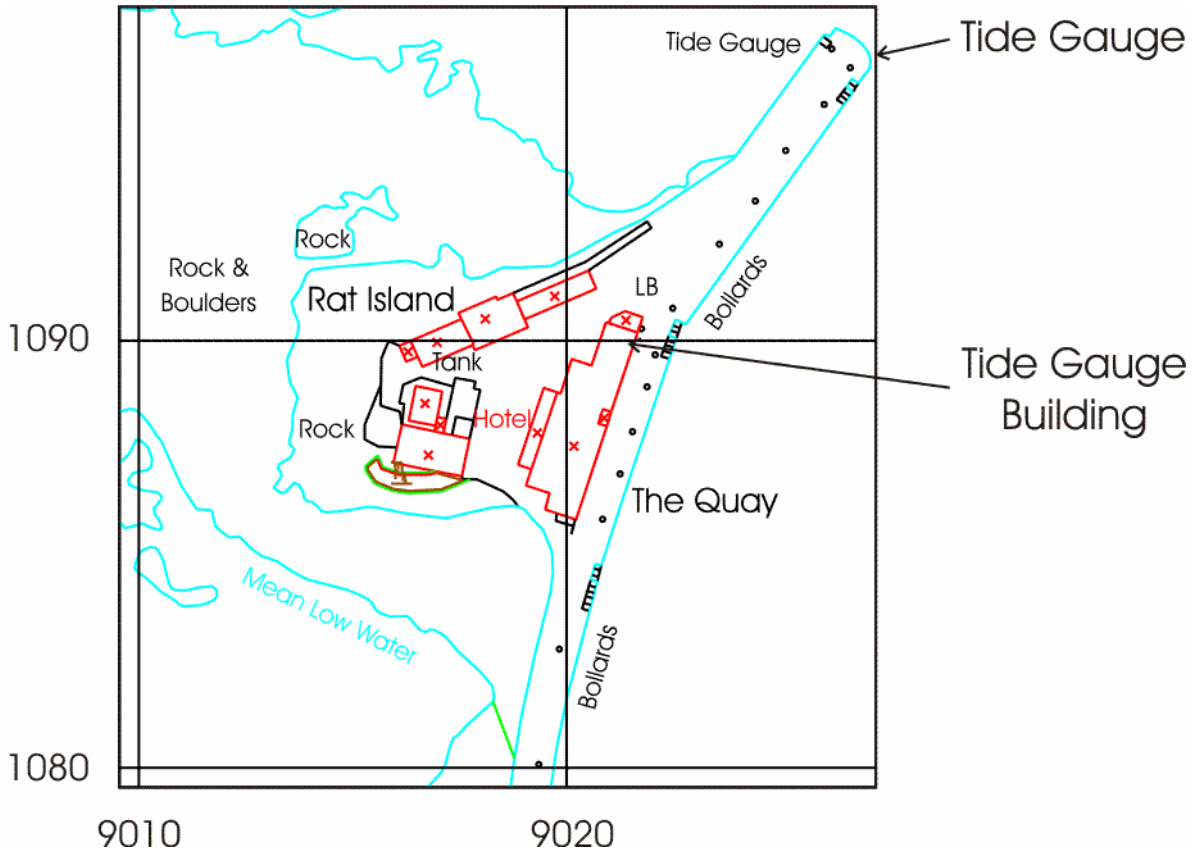
Benchmark Relationships
TGZ = Admiralty Chart Datum (ACD)
TGZ = 2.91m below Ordnance Datum Local (ODL)
TGZ = 7.425m below TGBM
TGZ = 7.399m below Aux 1
TGZ = 6.776m below Aux 2

Levelling No levelling was carried out in 2014

Site visits
27/09/2014 (Day 270) Maintenance - GSM backup intermittent. Damaged antenna wire and relocated incorrectly during harbour redevelopment works. New antenna fitted. GSM now OK. Survey of site for new gauge once harbour works are complete.

Notes on Data Quality
At the beginning of February 2014 there were reports of suspect data and differences of up to 106mm. This was due to severe storms.

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



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				0.366	31	20:45:00				-0.013	30	04:45:00
Feb	-0.004	12	17:15:00	0.675	5	00:45:00	-0.182	12	14:30:00	-0.101	19	03:45:00
Mar	0.188	5	08:15:00	0.291	24	09:45:00	-0.147	10	17:30:00	-0.233	19	01:15:00
Apr				0.405	26	08:00:00				-0.193	14	08:30:00
May				0.227	22	02:45:00				-0.255	15	12:00:00
Jun	0.233	27	07:30:00	0.233	27	07:30:00	-0.11	16	16:15:00	-0.152	12	03:00:00
July	0.242	18	02:00:00	0.162	1	00:45:00	-0.117	9	06:00:00	0.021	2	05:00:00
Aug	0.29	10	01:00:00				-0.072	15	19:00:00			
Sep	0.239	17	10:00:00	0.06	30	22:45:00	-0.114	26	16:15:00	-0.096	25	00:15:00
Oct	0.408	17	16:30:00	0.278	7	21:45:00	-0.168	21	15:30:00	-0.106	2	04:00:00
Nov	0.584	13	23:45:00	0.477	6	20:30:00	-0.082	23	16:30:00	-0.013	26	02:30:00
Dec	0.231	12	00:00:00	0.231	12	00:00:00	-0.25	28	21:30:00	-0.258	28	21:30:00

	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				3.296	31	04:45:00				-2.276	31	23:30:00
Feb	1.949	12	15:45:00	3.483	1	05:30:00	1.367	12	17:15:00	-2.196	1	00:00:00
Mar	2.999	5	07:15:00	3.203	31	05:00:00	-2.267	5	01:30:00	-2.433	31	23:45:00
Apr				3.177	2	06:15:00				-2.384	1	00:00:00
May				2.735	1	05:45:00				-2.446	15	23:30:00
Jun	2.772	16	19:15:00	2.858	15	18:15:00	-1.714	29	00:00:00	-2.456	16	00:45:00
July	3.17	14	18:15:00	2.397	1	19:00:00	-2.528	15	00:45:00	-1.564	1	01:00:00
Aug	3.373	12	18:00:00				-2.602	13	00:15:00			
Sep	3.361	10	17:30:00	2.603	27	18:15:00	-2.627	9	23:15:00	-1.991	24	23:30:00
Oct	3.493	8	16:30:00	3.198	7	15:45:00	-2.325	9	23:45:00	-2.119	7	22:15:00
Nov	3.296	6	16:15:00	3.296	6	16:15:00	-2.076	24	12:00:00	-2.129	7	23:15:00
Dec	2.935	24	06:00:00	2.938	24	06:00:00	-2.388	25	13:15:00	-2.38	25	13:15:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	0	*	1	*
February	0	*	3	*
March	5	*	10	*
April	0	*	28	0.295
May	0	*	12	*
June	8	*	16	0.28
July	31	0.286	0	*
August	31	0.323	0	*
September	30	0.329	2	*
October	31	0.442	2	*
November	22	0.513	4	*
December	31	0.258	22	0.254
TOTAL & AVG	189	**	100	**

*	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

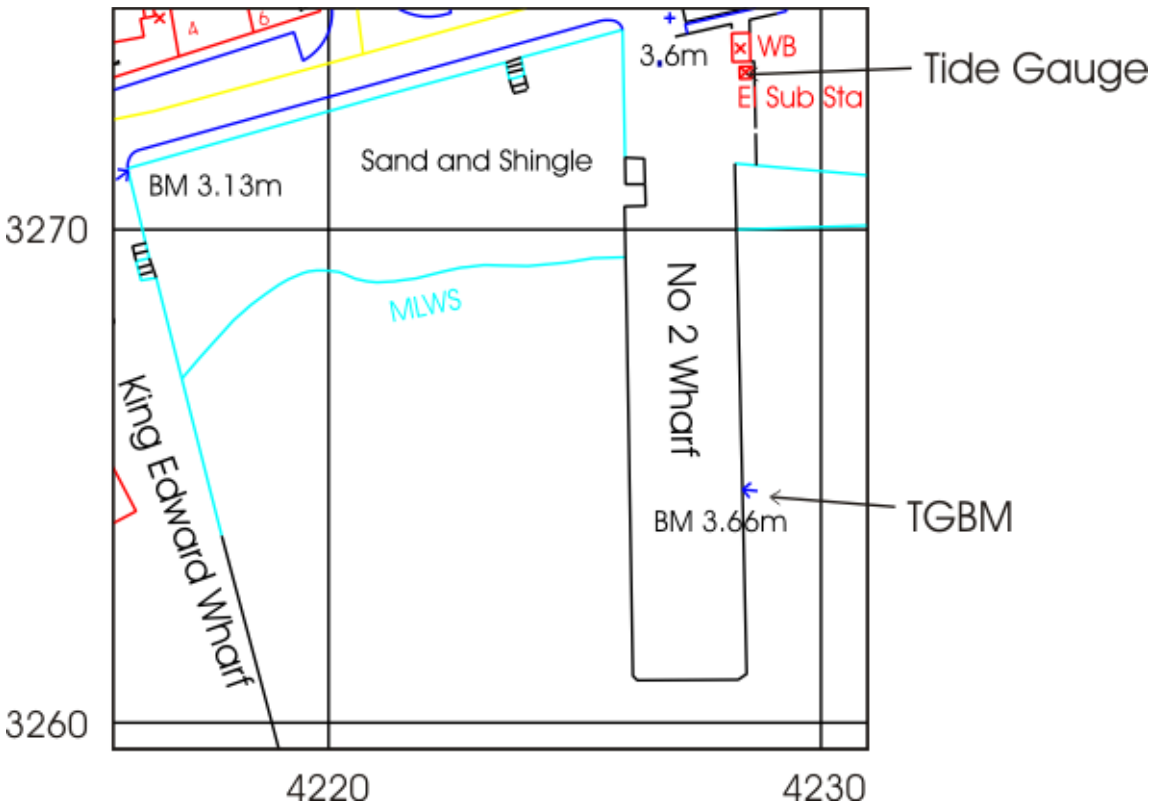
Levelling No levelling was carried out in 2014

Site visits

02/12/2014 (Day 336)	A pontoon had come adrift in a storm and cut through all 3 pneumatic lines - replaced and repaired. The compressor autodrain was also found to be faulty - disconnected. A new auto drain will be fitted on the next visit.

Notes on Data Quality
On 06/11/2014 all 3 channels were lost. TGI contacted the harbour and were informed that a pontoon came adrift in the storm and severed all 3 pneumatic lines. A site visit was made and all 3 lines were repaired.

Stornoway – Map & Images of Site



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	0.764	26	19:30:00	0.766	26	19:30:00	-0.237	29	15:45:00	-0.235	29	09:45:00
Feb	0.695	8	15:00:00	0.697	8	15:00:00	-0.1	16	04:00:00	-0.098	16	04:15:00
Mar	0.582	20	21:30:00	0.583	20	21:30:00	-0.271	26	10:30:00	-0.269	26	10:30:00
Apr	0.457	6	14:00:00	0.457	6	14:00:00	-0.121	14	21:30:00	-0.12	14	21:30:00
May	0.402	6	08:15:00	0.405	6	08:15:00	-0.199	23	19:45:00	-0.197	23	19:45:00
Jun	0.188	11	00:00:00	0.192	11	00:00:00	-0.216	15	22:45:00	-0.212	15	22:45:00
July	0.396	4	07:45:00	0.397	4	07:45:00	-0.146	9	07:30:00	-0.142	9	07:30:00
Aug	0.29	29	09:30:00	0.295	29	09:30:00	-0.165	17	22:45:00	-0.161	17	22:45:00
Sep	0.32	26	02:45:00	0.325	26	02:45:00	-0.173	13	12:30:00	-0.168	13	12:30:00
Oct	0.61	19	05:00:00	0.615	19	05:00:00	-0.186	22	00:15:00	-0.182	22	00:15:00
Nov	0.358	1	21:00:00	0.362	1	21:00:00	-0.186	5	07:15:00	-0.182	5	07:15:00
Dec	0.605	10	05:45:00	-0.093	2	20:45:00	-0.471	28	03:45:00	-0.159	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	3.179	3	08:15:00	3.179	3	08:15:00	-2.05	30	12:45:00	-2.048	30	12:45:00
Feb	3.258	1	07:30:00	3.259	1	07:30:00	-2.185	2	15:00:00	-2.183	2	15:00:00
Mar	2.93	3	08:00:00	2.93	3	08:00:00	-2.431	1	13:00:00	-2.429	1	13:00:00
Apr	2.458	1	07:30:00	2.46	1	07:30:00	-2.276	1	01:45:00	-2.273	1	01:45:00
May	2.249	17	20:30:00	2.252	17	20:30:00	-2.179	15	13:15:00	-2.177	15	13:15:00
Jun	2.213	14	19:30:00	2.214	14	19:30:00	-2.381	16	03:00:00	-2.377	16	03:00:00
July	2.721	14	20:15:00	2.719	14	20:15:00	-2.333	15	02:45:00	-2.33	15	02:45:00
Aug	2.919	11	19:15:00	2.919	11	19:15:00	-2.435	13	02:30:00	-2.431	13	02:30:00
Sep	2.753	10	19:30:00	2.754	10	19:30:00	-2.614	11	02:00:00	-2.61	11	02:00:00
Oct	2.878	8	18:30:00	2.878	8	18:30:00	-2.268	10	01:45:00	-2.264	10	01:45:00
Nov	2.462	6	06:15:00	2.451	6	06:15:00	-1.901	4	23:30:00	-1.898	4	23:30:00
Dec	2.628	24	08:00:00	1.634	2	15:30:00	-2.301	25	15:30:00	-1.432	2	22:00:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.43	31	0.431
February	28	0.442	28	0.443
March	31	0.207	31	0.208
April	30	0.18	30	0.182
May	31	0.122	31	0.125
June	30	0.113	30	0.116
July	31	0.201	31	0.205
August	31	0.217	31	0.22
September	30	0.196	30	0.2
October	31	0.412	31	0.415
November	4	*	4	*
December	28	0.312	0	*
TOTAL & AVG	336	0.273	308	**

*	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

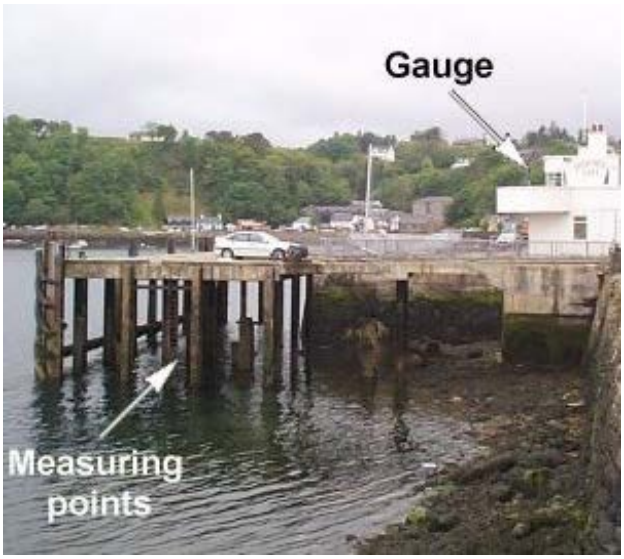
Benchmark Relationships
TGZ = Admiralty Chart Datum (ACD)
TGZ = 2.39m below Ordnance Datum Newlyn (ODN)
TGZ = Chart Datum = 6.856m below TGBM

Levelling No levelling was carried out in 2014

Site visits
07/02/2014 (Day 038) Compressor change.
01/07/2014 (Day 182) Maintenance.

Notes on Data Quality
The site met the agreed target of being operational for at least 75% of each calendar month in 2014.

Tobermory – Map & Images of Site



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	1.144	3	12:30:00	1.142	3	12:30:00	-0.198	29	15:15:00	-0.198	29	15:15:00
Feb	0.984	8	13:45:00	0.982	8	13:45:00	-0.13	28	18:30:00	-0.131	28	18:30:00
Mar	0.603	20	03:00:00	0.603	20	03:00:00	-0.285	26	07:15:00	-0.286	26	07:15:00
Apr	0.551	6	13:15:00	0.55	6	13:15:00	-0.186	14	11:00:00	-0.187	14	11:00:00
May	0.391	5	18:00:00	0.39	5	18:00:00	-0.258	23	20:45:00	-0.259	23	20:45:00
Jun	0.212	7	11:15:00	0.212	7	11:15:00	-0.226	15	16:15:00	-0.225	15	16:15:00
July	0.397	4	09:00:00	0.394	4	09:00:00	-0.19	9	10:00:00	-0.193	9	10:00:00
Aug	0.411	29	08:30:00	0.409	29	08:30:00	-0.196	18	06:30:00	-0.199	18	06:30:00
Sep	0.245	26	02:45:00	0.242	26	02:45:00	-0.163	20	18:30:00	-0.165	20	18:30:00
Oct	0.709	19	06:00:00	0.706	19	06:00:00	-0.33	21	23:30:00	-0.334	21	23:30:00
Nov	0.514	6	11:00:00	0.507	6	11:00:00	-0.155	5	08:00:00	-0.16	5	08:00:00
Dec	-0.072	26	19:30:00	0.574	9	13:45:00	-0.305	27	09:45:00	-0.551	28	05:30:00

	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	3.338	3	07:30:00	3.336	3	07:15:00	-1.728	30	23:45:00	-1.73	30	23:45:00
Feb	3.193	1	06:45:00	3.192	1	06:45:00	-1.951	28	23:45:00	-1.952	28	23:45:00
Mar	2.955	3	07:15:00	2.953	3	07:15:00	-2.046	31	00:00:00	-2.047	31	00:00:00
Apr	2.528	1	06:45:00	2.527	1	06:45:00	-1.944	1	01:00:00	-1.945	1	00:45:00
May	2.257	17	19:30:00	2.257	17	19:30:00	-1.843	16	00:30:00	-1.844	16	00:30:00
Jun	2.208	14	18:45:00	2.207	14	18:45:00	-1.962	15	13:30:00	-1.963	15	13:30:00
July	2.699	14	19:15:00	2.697	14	19:15:00	-1.995	15	14:15:00	-1.998	15	14:15:00
Aug	2.887	12	19:00:00	2.884	12	19:00:00	-2.061	13	14:00:00	-2.064	13	13:45:00
Sep	2.727	10	18:45:00	2.725	10	18:45:00	-2.2	10	12:45:00	-2.203	10	12:45:00
Oct	2.896	8	17:45:00	2.893	8	17:45:00	-1.869	10	00:45:00	-1.873	10	00:45:00
Nov	2.945	6	17:15:00	2.94	6	17:15:00	-1.553	5	10:30:00	-1.573	25	01:30:00
Dec	2.059	26	08:45:00	2.573	24	07:15:00	-1.509	26	15:15:00	-1.793	26	02:30:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.595	31	0.594
February	28	0.627	28	0.626
March	31	0.328	31	0.327
April	30	0.325	30	0.324
May	31	0.273	31	0.272
June	30	0.252	30	0.251
July	31	0.322	31	0.319
August	31	0.356	31	0.353
September	30	0.324	30	0.322
October	31	0.563	31	0.559
November	19	0.596	30	0.54
December	0	*	31	0.414
TOTAL & AVG	323	0.415	365	0.408

*	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

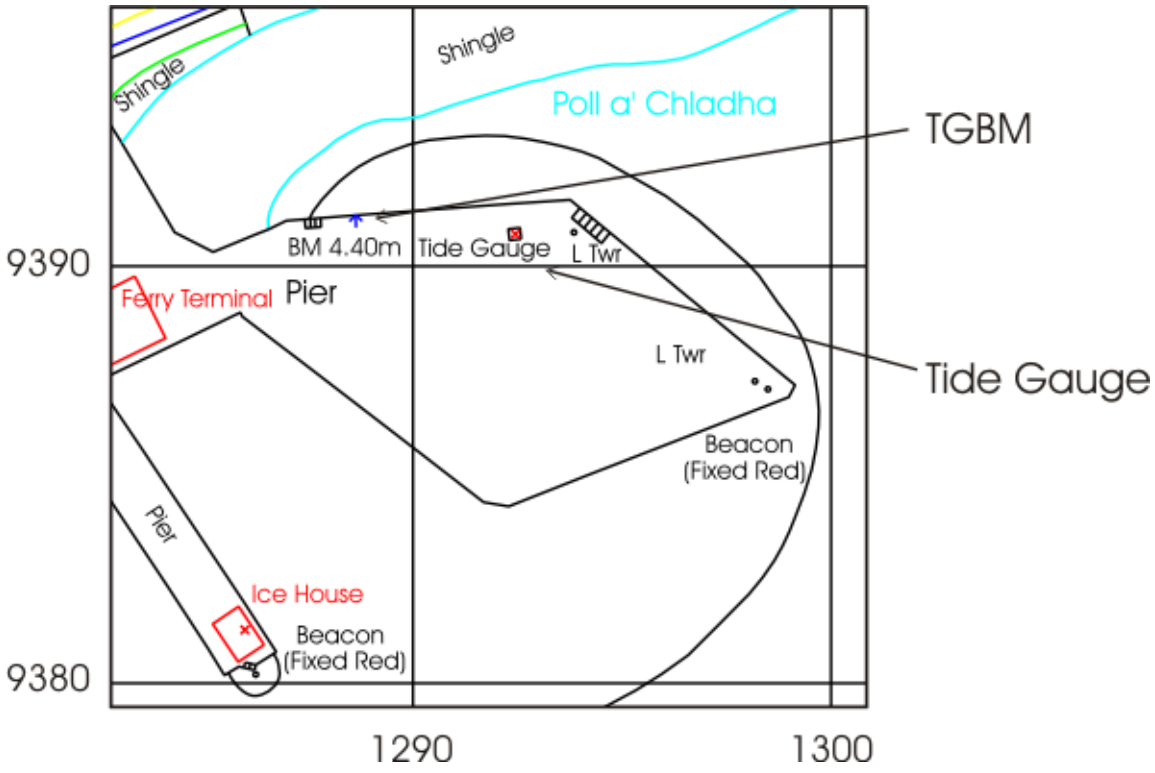
Benchmark Relationships
TGZ = Admiralty Chart Datum (ACD)
TGZ = 2.75m below Ordnance Datum Newlyn (ODN)
TGZ = 7.155m below TGBM

Levelling No levelling was carried out in 2014

Site visits
03/10/2014 (Day 276) Maintenance. Compressor change. Water/damp damage refurbishment.

Notes on Data Quality
The site met the agreed target of being operational for at least 75% of each calendar month in 2014.

Ullapool – Map & Images of Site



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	0.784	3	15:15:00	0.818	3	15:15:00	-0.35	29	09:45:00	-0.325	29	08:30:00
Feb	0.703	8	21:00:00	0.739	8	21:00:00	-0.184	16	04:30:00	-0.143	16	04:30:00
Mar	0.638	8	20:00:00	0.67	8	20:00:00	-0.356	26	11:15:00	-0.332	26	11:15:00
Apr	0.468	6	13:45:00	0.491	6	13:45:00	-0.219	21	07:15:00	-0.187	21	07:15:00
May	0.378	6	00:45:00	0.406	5	20:45:00	-0.294	23	09:00:00	-0.263	23	09:00:00
Jun	0.161	11	00:30:00	0.194	11	00:30:00	-0.288	17	06:00:00	-0.251	17	05:45:00
July	-0.015	1	04:30:00	0.418	4	08:45:00	-0.081	1	04:00:00	-0.213	9	07:15:00
Aug	0.297	29	09:45:00	0.349	11	08:45:00	-0.178	15	11:30:00	-0.179	15	11:30:00
Sep	0.386	26	02:30:00	0.42	26	02:30:00	-0.225	13	07:15:00	-0.272	21	13:15:00
Oct	0.649	21	03:30:00	0.664	21	03:30:00	-0.298	22	01:15:00	-0.276	21	18:15:00
Nov	0.539	6	20:15:00	0.557	6	20:15:00	-0.248	5	00:00:00	-0.226	5	00:00:00
Dec	0.711	10	06:00:00	0.736	10	06:00:00	-0.564	28	05:45:00	-0.55	28	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	3.465	3	08:00:00	3.502	3	08:00:00	-2.181	31	13:30:00	-2.15	31	13:30:00
Feb	3.458	1	07:45:00	3.5	1	07:45:00	-2.309	2	15:00:00	-2.279	2	15:00:00
Mar	3.212	3	08:00:00	3.247	3	08:00:00	-2.537	1	13:15:00	-2.508	1	13:15:00
Apr	2.673	1	08:00:00	2.701	1	07:30:00	-2.38	1	01:45:00	-2.357	1	01:45:00
May	2.522	17	20:45:00	2.551	17	20:45:00	-2.189	15	13:30:00	-2.163	15	13:30:00
Jun	2.462	14	19:45:00	2.491	14	19:45:00	-2.448	16	03:00:00	-2.424	16	03:00:00
July	0.556	1	00:00:00	2.986	14	20:15:00	-1.659	1	03:15:00	-2.39	15	02:45:00
Aug	3.162	12	20:15:00	3.204	12	20:00:00	-2.436	14	03:30:00	-2.451	13	02:30:00
Sep	3.004	10	19:45:00	3.028	10	19:45:00	-2.687	10	01:30:00	-2.666	10	01:30:00
Oct	3.137	8	18:30:00	3.169	8	18:30:00	-2.362	10	02:00:00	-2.334	10	02:00:00
Nov	3.128	6	18:45:00	3.15	6	18:45:00	-1.938	25	15:00:00	-1.917	25	15:00:00
Dec	2.926	24	08:15:00	2.934	24	08:15:00	-2.337	25	15:30:00	-2.329	25	15:30:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.538	31	0.568
February	28	0.551	28	0.583
March	31	0.32	31	0.346
April	30	0.291	30	0.317
May	31	0.224	31	0.253
June	29	0.21	30	0.238
July	0	*	31	0.316
August	18	0.311	31	0.346
September	25	0.303	25	0.322
October	24	0.498	24	0.523
November	26	0.484	26	0.509
December	31	0.436	31	0.456
TOTAL & AVG	304	0.379	349	0.398

*	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

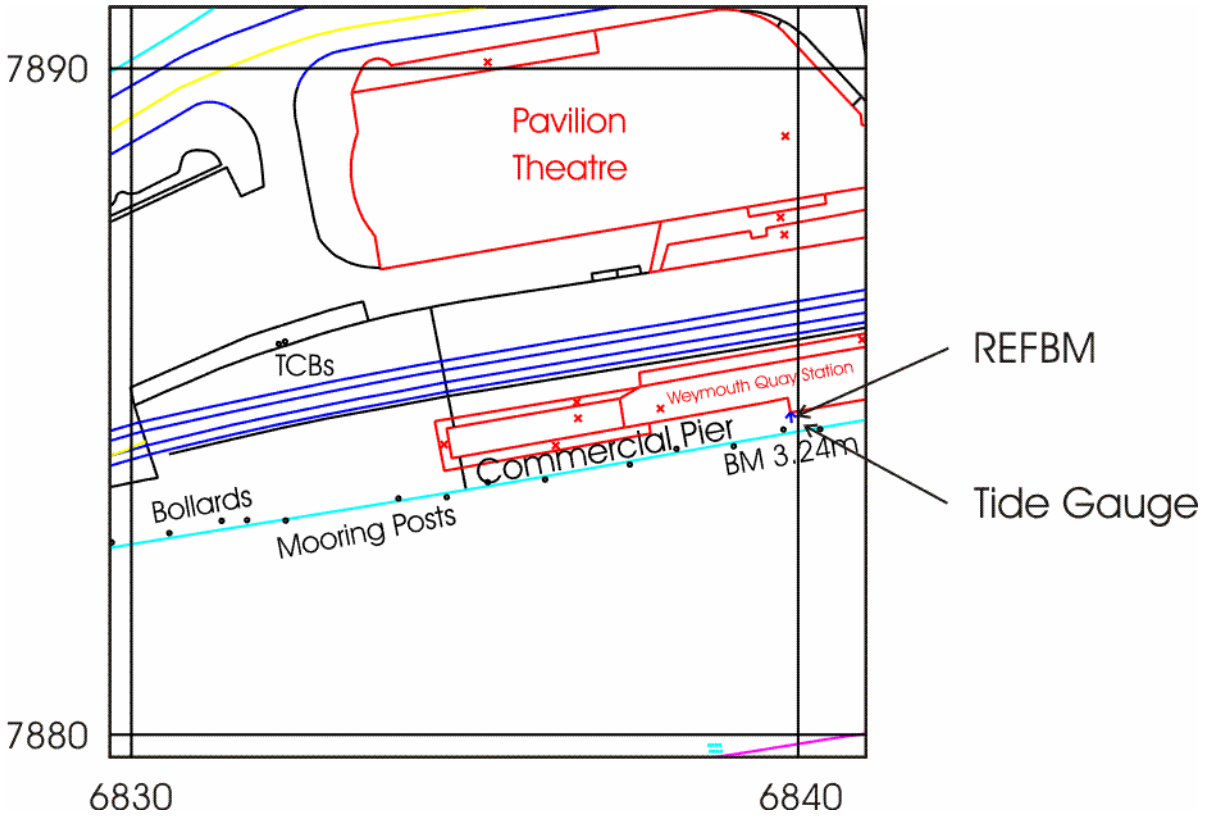
Levelling No levelling was carried out in 2014

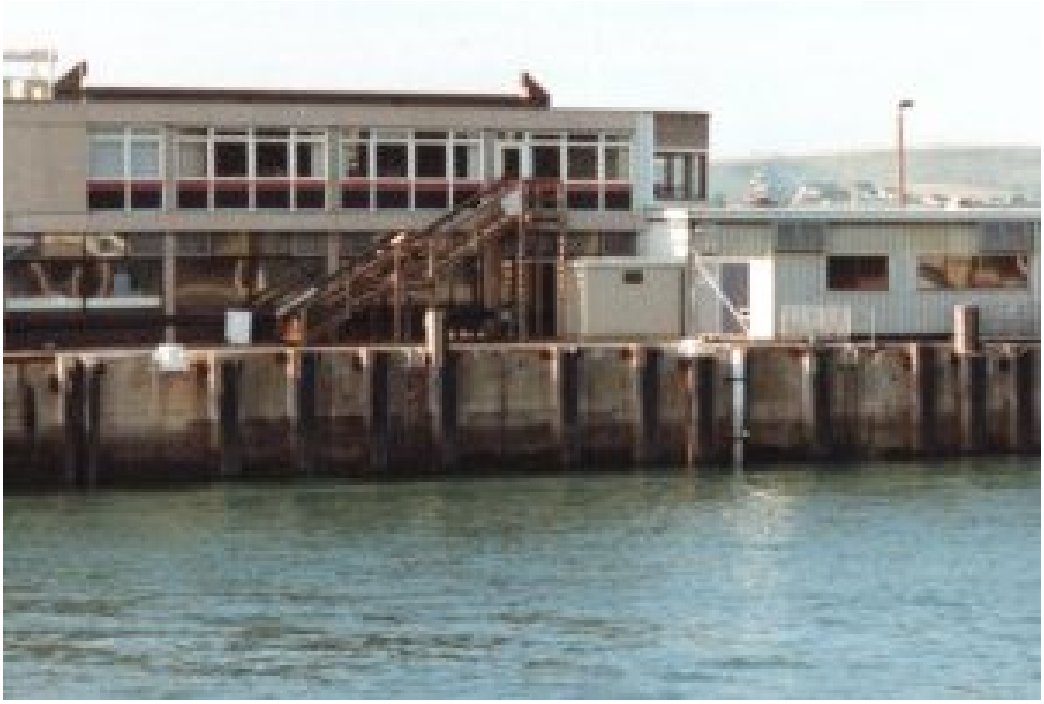
Site visits

15/01/2014 (Day 015)	Clearing a pneumatic line blockage.
03/04/2014 (Day 093)	Maintenance. Diving inspection and clear blocking channel - report of damage to steelwork but data OK.

Notes on Data Quality
The site met the agreed target of being operational for at least 75% of each calendar month in 2014.

Weymouth – Map & Images of Site





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	0.621	3	15:00:00	0.645	3	15:00:00	-0.434	25	08:00:00	-0.407	25	08:00:00
Feb	1.025	14	21:00:00	1.076	14	21:00:00	-0.335	6	05:30:00	-0.308	6	05:30:00
Mar	0.376	2	17:15:00	0.403	2	18:15:00	-0.347	15	00:00:00	-0.324	15	00:00:00
Apr	0.345	26	09:45:00	0.371	26	09:45:00	-0.298	16	01:15:00	-0.272	16	01:15:00
May	0.32	23	04:45:00	0.346	23	04:45:00	-0.376	15	13:15:00	-0.35	15	13:15:00
Jun	0.214	27	12:15:00	0.239	27	12:15:00	-0.269	17	07:00:00	-0.244	17	07:00:00
July	0.22	18	02:15:00	0.253	18	02:15:00	-0.223	16	14:30:00	-0.195	16	14:30:00
Aug	0.361	10	09:15:00	0.384	10	09:15:00	-0.209	16	15:30:00	-0.185	16	15:30:00
Sep	0.195	19	02:30:00	0.199	19	02:30:00	-0.205	1	16:45:00	-0.187	1	16:45:00
Oct	0.474	6	07:15:00	0.489	6	07:15:00	-0.224	22	23:00:00	-0.217	22	23:00:00
Nov	0.468	14	03:00:00	0.51	14	03:00:00	-0.178	25	02:15:00	-0.139	25	02:15:00
Dec	0.418	10	14:15:00	0.459	10	14:15:00	-0.549	10	03:30:00	-0.508	10	03:30:00

	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	1.989	3	08:00:00	2.015	3	08:00:00	-0.825	30	14:30:00	-0.799	30	14:30:00
Feb	1.965	14	19:45:00	2.004	14	19:45:00	-1.144	2	16:45:00	-1.116	2	16:45:00
Mar	1.834	3	08:30:00	1.861	3	08:30:00	-1.008	1	15:00:00	-0.983	1	15:00:00
Apr	1.544	2	08:45:00	1.569	2	08:45:00	-0.909	16	12:00:00	-0.884	16	12:00:00
May	1.281	1	20:00:00	1.306	1	20:15:00	-1.006	17	04:15:00	-0.982	17	04:15:00
Jun	1.356	14	19:45:00	1.381	14	20:00:00	-1.01	16	05:00:00	-0.986	16	05:00:00
July	1.569	14	20:30:00	1.596	14	20:30:00	-1.074	15	04:45:00	-1.048	15	04:45:00
Aug	1.702	12	20:15:00	1.725	12	20:15:00	-1.13	12	03:30:00	-1.106	12	03:30:00
Sep	1.721	10	20:00:00	1.717	10	20:00:00	-1.111	11	04:00:00	-1.111	11	04:00:00
Oct	1.872	8	18:45:00	1.879	8	18:45:00	-0.817	10	03:30:00	-0.817	10	03:30:00
Nov	1.749	6	18:30:00	1.779	6	18:30:00	-0.679	24	16:00:00	-0.64	24	16:00:00
Dec	1.431	24	08:30:00	1.462	24	08:30:00	-0.931	24	16:30:00	-0.903	24	16:30:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.346	26	0.375
February	28	0.351	28	0.378
March	31	0.13	31	0.154
April	30	0.184	30	0.209
May	31	0.151	31	0.176
June	30	0.152	30	0.178
July	31	0.189	31	0.217
August	31	0.23	31	0.252
September	30	0.239	30	0.246
October	31	0.331	31	0.338
November	30	0.392	30	0.425
December	31	0.165	31	0.201
TOTAL & AVG	365	0.238	360	0.262

*	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

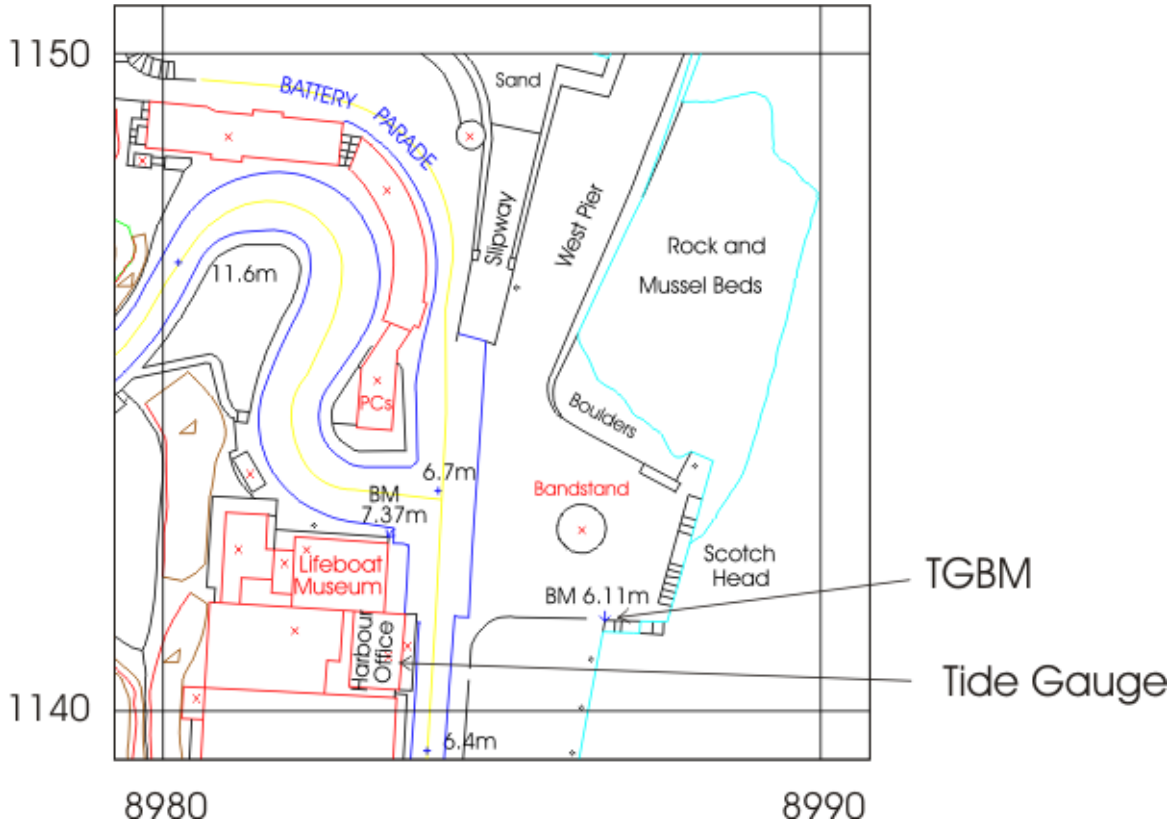
Levelling No levelling was carried out in 2014

Site visits

29/01/2014 (Day 029)	Compressor change.
19/05/2014 (Day 139)	Maintenance. Meeting with electrical inspectors at site.
05/06/2014 (Day 156)	Meeting with the HM and site survey due to redevelopment of the TG area later in the year.
15/12/2014 (Day 349)	Faulty outstation replaced. BT fitted a new master box and cable (following a reported fault).

Notes on Data Quality
In December there was a report of no data from site. The BT line was found to be faulty. BT repaired the fault. A local contact attended the gauge and found the equipment to be unresponsive but power to the equipment appeared OK. The outstation was faulty and replaced. BT have installed a new master socket and line due the redevelopment works. An EA electrician will be required to connect the lightning arrester into this new box.

Whitby – Map & Images of Site



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	3.046	28	15:00:00	0.663	4	14:30:00	-0.711	24	22:45:00	-0.711	24	22:45:00
Feb	0.536	24	18:00:00	0.538	24	18:00:00	-0.551	13	00:30:00	-0.55	13	00:30:00
Mar	0.954	14	23:45:00	0.953	14	23:45:00	-0.586	8	15:30:00	-0.584	8	15:30:00
Apr	0.563	12	23:45:00	0.566	12	23:45:00	-0.195	15	23:30:00	-0.196	15	12:00:00
May	0.429	6	20:15:00	0.427	6	20:15:00	-0.179	14	23:15:00	-0.177	14	23:15:00
Jun	0.394	19	06:00:00	0.401	19	06:00:00	-0.065	17	15:15:00	-0.056	17	15:15:00
July	0.434	5	00:00:00	0.444	5	00:00:00	-0.074	16	17:30:00	-0.062	16	17:30:00
Aug	0.466	10	13:00:00	0.477	10	13:00:00	-0.162	3	18:15:00	-0.148	3	18:15:00
Sep	0.586	26	12:30:00	0.594	26	12:30:00	-0.125	11	14:00:00	-0.117	11	14:00:00
Oct	1.188	21	20:15:00	1.2	21	20:15:00	-0.215	6	11:45:00	-0.208	6	11:45:00
Nov	0.434	8	10:15:00	0.442	8	10:15:00	-0.254	6	17:30:00	-0.247	6	17:30:00
Dec	0.562	16	13:30:00	0.565	22	11:15:00	-0.312	21	05:45:00	-0.309	21	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	4.696	28	15:00:00	3.464	4	18:00:00	-2.239	6	00:45:00	-2.232	6	00:45:00
Feb	3.233	2	17:45:00	3.234	2	17:45:00	-2.21	4	00:30:00	-2.206	4	00:30:00
Mar	3.185	3	17:15:00	3.182	3	17:15:00	-2.243	5	01:00:00	-2.235	5	01:00:00
Apr	2.988	17	17:15:00	2.987	17	17:15:00	-2.241	15	22:15:00	-2.231	15	22:15:00
May	2.743	17	05:15:00	2.745	17	05:15:00	-2.17	14	22:00:00	-2.164	14	22:00:00
Jun	2.82	16	05:45:00	2.827	16	05:45:00	-2.261	15	11:30:00	-2.236	15	11:30:00
July	3.1	15	05:45:00	3.109	15	05:45:00	-2.265	16	12:15:00	-2.236	16	12:15:00
Aug	3.311	13	05:15:00	3.321	13	05:15:00	-2.218	14	12:15:00	-2.204	14	12:15:00
Sep	3.265	10	04:15:00	3.273	10	04:15:00	-2.256	9	09:15:00	-2.235	10	23:00:00
Oct	3.318	9	03:45:00	3.323	9	03:45:00	-2.242	8	09:45:00	-2.231	8	09:45:00
Nov	3.087	8	04:15:00	3.092	8	04:15:00	-2.163	6	09:30:00	-2.153	6	09:30:00
Dec	3.087	23	16:30:00	3.089	23	16:30:00	-2.237	26	00:45:00	-2.223	26	00:45:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.452	31	0.453
February	28	0.483	28	0.484
March	31	0.424	31	0.423
April	30	0.44	30	0.44
May	31	0.404	31	0.407
June	30	0.428	30	0.434
July	30	0.475	30	0.486
August	29	0.503	29	0.514
September	28	0.501	28	0.511
October	31	0.604	31	0.612
November	30	0.557	30	0.562
December	23	0.549	23	0.551
TOTAL & AVG	352	0.485	352	0.490

*	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

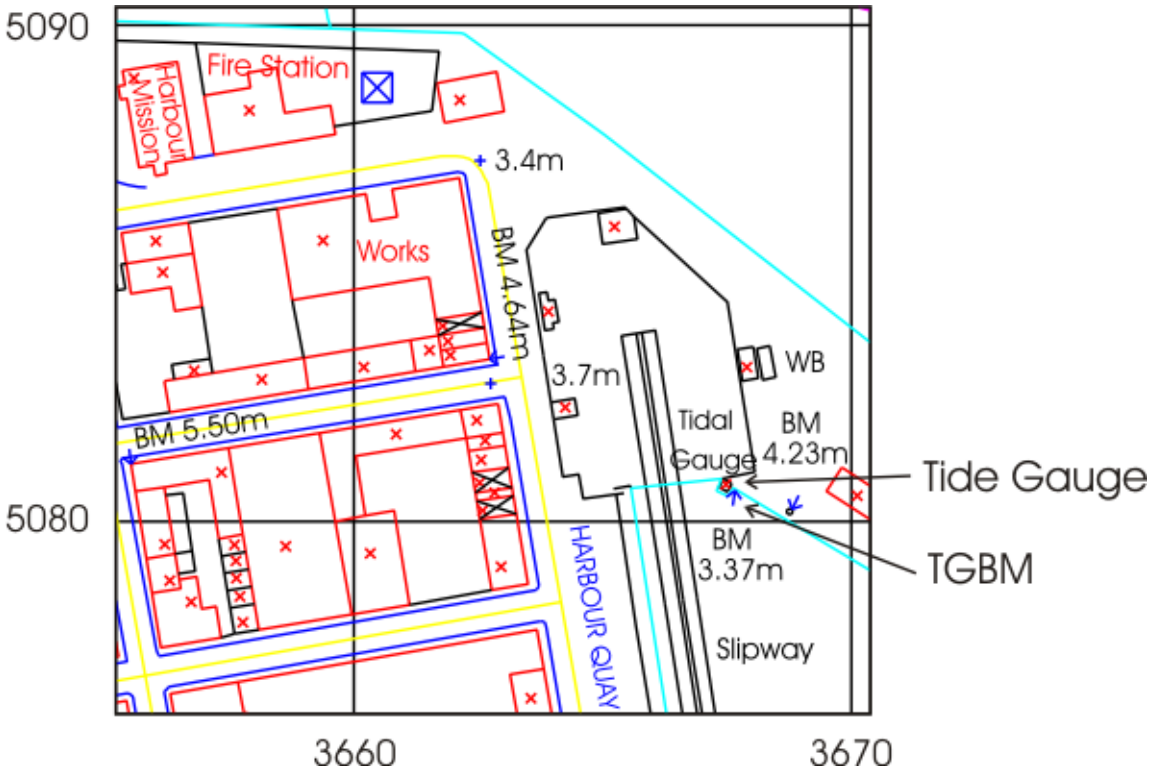
Benchmark Relationships
TGZ = Admiralty Chart Datum (ACD)
TGZ = 1.71m below Ordnance Datum (ODN)
TGZ = 5.084m below TGBM

Levelling No levelling was carried out in 2014

Site visits
08/09/2014 (Day 251) Diving to clear blocking channel.
05/10/2014 (Day 278) Maintenance. Compressor change.

Notes on Data Quality
Channel 1 was flagged between May and August due to blocking. TGI dived on site in September to clear the blockage. In November and December 2014 the pressure point was blocking and was cleared locally. The site will require diving in the New Year. The transfer channel was changed from Channel 2 to Channel 1 as Channel 2 showed signs of some residual blockage.

Wick – Map & Images of Site



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	0.587	6	13:00:00	0.564	6	13:00:00	-0.309	29	20:15:00	-0.311	29	20:15:00
Feb	0.585	9	04:30:00	0.583	9	04:30:00	-0.113	19	09:45:00	-0.116	19	09:45:00
Mar	0.556	21	04:15:00	0.554	21	04:15:00	-0.311	28	19:30:00	-0.315	28	19:30:00
Apr	0.446	12	19:15:00	0.438	12	19:15:00	-0.14	15	07:00:00	-0.15	15	07:00:00
May				0.368	6	18:45:00				-0.214	23	12:45:00
Jun				0.162	10	16:00:00				-0.208	17	08:15:00
July				0.389	4	17:00:00				-0.152	9	12:15:00
Aug				0.208	5	23:45:00				-0.135	27	01:15:00
Sep	4.51	8	09:15:00	0.355	26	06:30:00	-0.228	13	13:15:00	-0.23	13	13:15:00
Oct	0.586	26	10:15:00	0.583	26	10:15:00	-0.149	14	03:30:00	-0.153	14	03:30:00
Nov	0.386	2	12:15:00	0.382	2	12:15:00	-0.176	5	05:30:00	-0.179	17	23:00:00
Dec	0.629	10	18:15:00	0.612	9	21:45:00	-0.471	28	08:15:00	-0.2	5	20:00:00

	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	2.58	4	13:00:00	2.153	6	13:30:00	-1.348	30	16:45:00	-1.351	30	16:45:00
Feb	2.468	2	13:00:00	2.466	2	13:00:00	-1.257	2	19:15:00	-1.259	2	19:15:00
Mar	2.248	3	12:30:00	2.246	3	12:30:00	-1.558	29	16:00:00	-1.563	29	16:00:00
Apr	1.95	1	12:15:00	1.943	1	12:15:00	-1.348	1	18:15:00	-1.357	1	18:15:00
May				1.849	18	01:15:00				-1.276	14	16:45:00
Jun				1.774	13	23:30:00				-1.502	15	06:30:00
July				2.188	15	00:45:00				-1.459	14	06:15:00
Aug				1.821	29	01:00:00				-1.171	27	06:00:00
Sep	6.002	8	09:15:00	2.196	11	00:15:00	-1.58	10	05:30:00	-1.583	10	05:30:00
Oct	2.336	8	23:00:00	2.333	8	23:00:00	-1.22	10	06:00:00	-1.222	10	06:00:00
Nov	2.248	6	22:45:00	2.245	6	22:45:00	-1.162	5	03:45:00	-1.165	5	03:45:00
Dec	2.265	23	12:15:00	2.067	10	01:15:00	-1.432	25	19:45:00	-0.993	6	04:30:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	25	0.531	19	0.456
February	28	0.551	28	0.549
March	31	0.344	31	0.341
April	12	*	27	0.3
May	0	*	31	0.257
June	0	*	30	0.258
July	0	*	31	0.332
August	0	*	16	0.339
September	22	0.36	30	0.345
October	31	0.557	31	0.554
November	23	0.519	23	0.515
December	20	0.468	0	*
TOTAL & AVG	192	**	297	0.386

*	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 2014

Site visits
14/05/2014 (Day 134) Meeting with electrical inspectors at site.
10/11/2014 (Day 314) 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 2014.

Workington – Map & Images of Site

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	1.068	3	16:00:00	1.048	3	16:00:00	-0.473	26	03:15:00	-0.479	26	03:15:00
Feb	1.86	12	17:30:00	1.859	12	17:30:00	-0.278	28	18:30:00	-0.631	28	13:15:00
Mar	0.707	20	09:00:00	0.705	20	09:00:00	-0.506	25	21:30:00	-0.5	25	21:30:00
Apr	0.587	6	13:30:00	0.591	6	13:15:00	-0.371	20	22:00:00	-0.373	20	22:00:00
May	0.468	10	18:00:00	0.471	10	18:00:00	-0.409	23	21:15:00	-0.408	23	21:00:00
Jun	0.173	10	18:15:00	0.175	10	18:15:00	-0.358	17	17:15:00	-0.351	17	17:15:00
July	0.364	4	08:30:00	0.37	4	08:30:00	-0.316	9	11:45:00	-0.309	9	12:15:00
Aug	0.445	29	07:15:00	0.44	29	07:15:00	-0.243	18	03:30:00	-0.246	18	03:30:00
Sep	0.139	26	06:30:00	0.141	26	06:30:00	-0.283	1	13:00:00	-0.286	1	13:15:00
Oct	1.012	21	04:30:00	1.009	21	04:30:00	-0.53	21	19:30:00	-0.531	21	19:30:00
Nov	0.716	1	22:00:00	0.723	1	22:00:00	-0.345	5	12:15:00	-0.344	5	12:30:00
Dec	0.812	9	18:45:00	0.821	9	18:45:00	-0.689	28	01:45:00	-0.686	28	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	5.716	3	12:30:00	5.696	3	12:30:00	-3.519	4	20:00:00	-3.542	4	20:00:00
Feb	5.576	1	12:15:00	5.573	1	12:15:00	-3.792	2	19:45:00	-3.804	2	19:45:00
Mar	5.196	2	12:00:00	5.17	2	12:00:00	-3.927	3	19:30:00	-3.927	3	19:30:00
Apr	4.622	1	12:15:00	4.622	1	12:15:00	-3.744	1	19:00:00	-3.74	1	19:00:00
May	4.241	18	01:30:00	4.239	18	01:30:00	-3.594	17	07:15:00	-3.624	17	07:15:00
Jun	4.266	15	00:30:00	4.259	15	00:30:00	-3.812	16	07:45:00	-3.819	16	07:45:00
July	4.752	15	01:00:00	4.746	15	01:00:00	-3.945	15	07:45:00	-3.952	15	07:45:00
Aug	5.051	13	00:45:00	5.046	13	00:45:00	-3.909	13	07:15:00	-3.916	13	07:15:00
Sep	4.919	11	00:15:00	4.912	11	00:15:00	-3.911	10	18:30:00	-4.109	10	06:15:00
Oct	5.14	8	23:15:00	5.138	8	23:15:00	-3.566	10	06:30:00	-3.567	10	06:30:00
Nov	4.947	6	23:00:00	4.943	6	23:00:00	-3.284	5	04:00:00	-3.28	5	04:00:00
Dec	4.6	23	12:00:00	4.602	23	12:00:00	-3.623	25	20:15:00	-3.617	25	20:15:00

	Mean Sea Level			
	Channel 1		Channel 2	
January	31	0.577	31	0.571
February	26	0.687	28	0.649
March	28	0.248	31	0.261
April	30	0.261	30	0.261
May	31	0.228	31	0.229
June	30	0.207	30	0.207
July	29	0.26	31	0.265
August	30	0.341	31	0.335
September	22	0.276	30	0.268
October	31	0.513	31	0.514
November	30	0.495	30	0.496
December	31	0.361	31	0.366
TOTAL & AVG	349	0.371	365	0.369

*	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