

## **1.1 Background to the Flood Event**

On 5<sup>th</sup> December 2013, a high astronomical tide combined with storm surge (low atmospheric pressure) resulted in elevated sea levels. Strong (severe gale force 9 at times) onshore (northerly) winds created large waves which overtopped Denbighshire's coastal defences. The most significant overtopping occurred between Splash Point and Rhyl Golf course, leading to the flooding of 140 properties. Whilst the rate of overtopping was less at West Rhyl, serious flooding was only averted by the strategic deployment of sandbags at the junction of West Parade and numerous side roads in the area. The Nova Centre in Prestatyn suffered minor internal flooding.

As well as flooding of property, there was significant damage to the coastal infrastructure, in particular, between West Rhyl and Rhyl Golf Course. The sand dune system at Barkby Beach and Gronant Dunes suffered significant damage due to wave action, with lateral losses of up to 8 metres, ie. there is up to 8 metres less sand dune than there was before the storm. The Prestatyn defences performed very well (there was very little flooding)

## **1.2 Investigation of the Flood Event**

On 10<sup>th</sup> December 2013, the Minister for Natural Resources and Food, Alun Davies AM, addressed the Senedd and explained that he had asked Natural Resources Wales to coordinate the investigation into the 5<sup>th</sup> December 2013 coastal flood event, which affected the whole of the North Wales Coastline and covered four local authorities. The Minister said that he felt one comprehensive report was better than four separate reports.

The investigation was subsequently referred to as the Wales Coastal Flooding Review and was expanded in scope to cover the whole of Wales, following flooding in South and West Wales as a consequence of the January 2014 storms. The review was carried out in two phases. Phase 1, which made an assessment of impact of the storms, was published on 31<sup>st</sup> January 2014. Phase 2 of the Review, which concluded the investigation and made 47 recommendations, was published on 30<sup>th</sup> April 2014. The documents can be found by using the following links:

<http://naturalresourceswales.gov.uk/alerts/flood-warnings/recent-flooding-incidents/wales-coastal-flooding-report/?lang=en>

<http://naturalresourceswales.gov.uk/alerts/flood-warnings/recent-flooding-incidents/wales-coastal-flooding-review-phase-2-report/?lang=en>

In addition, the Council has carried out its own assessment of the flooding of the A548 Coast Road, Garford Road and surrounding areas. The report, which is referenced in the Natural Resources Wales Review, can be found by using the following link:

<https://www.denbighshire.gov.uk/en/resident/news/may-2014/Garford-Road-flooding-report.aspx>

### 1.3 Summary of the Findings of the Investigation

#### 1.3.1 Why did the flooding happen?

The coastal defences were overtopped by very large waves, driven onshore by gale force winds which occurred at the same time as high astronomical tides combined with an atmospheric storm surge. The secondary defences were breached at Garford Road, but would have been overtopped anyway due to the volume of water coming over the main sea wall.

#### 1.3.2 How likely is it for that scale of flooding to happen again?

Unfortunately, Natural Resources Wales and its consultants have been unable to determine the severity of the 5<sup>th</sup> December 2013 event. This is largely due to the complexity of the assessment of the joint probability of several extreme conditions (high astronomical tide, tidal storm surge, gale force winds from a northerly direction and large wave heights) all occurring at the same time. To quote from the Review:

*'Return periods for the coincident sea levels and wave heights seen in December 2013 and January 2014 have been calculated using the DEFRA 'desk study' approach (FD2308). These are very large and extremely sensitive to the level of dependence assumed. Such extreme values mean that we have little confidence in the reported numbers and can only conclude, qualitatively, that the combination of wave and sea level seen in December 2013 and January 2014 made them significantly rarer than their still water level return period alone.'*

The Natural Resources Wales Review recommends that further analytical work needs to be carried out to determine the severity of the December 2013 and January 2014 storms and to update the guidance used for the assessment of the standard of protection provided by the coastal defences.

#### 1.3.3 What improvement actions are needed to ensure that flood risk in the County is appropriately managed in future?

The Natural Resources Wales Review makes 47 recommendations in total (at the time of writing, the recommendations have yet to receive Ministerial approval). **Recommendation 24** is directly relevant to Denbighshire County Council:

***Options to seek improvements to the standard of protection at the Garford Road area of Rhyl should be identified and evaluated. This should include detailed hydraulic analysis of the capacity and performance of the storage lagoon. This should include an assessment of the stairwell and slipway openings and the interaction with the adjacent golf course area.***

In response to this recommendation, the Council has carried out the following actions:

- A topographical survey of Rhyl Golf Course has been carried out to determine the capacity of the course to temporarily store water which overtops the defences, before releasing it back out to sea at low tide. The initial feasibility assessment is favourable. However, discussions with Rhyl Golf Club will be required before detailed proposals can be finalised.
- Specialist consultants have been appointed to assist with the hydraulic analysis of the lagoon and the golf course. The consultants will also look at options to reduce the risk of overtopping of the primary coastal defences between Splash Point and the Golf Course.

#### **1.4 Welsh Government Grant Aid to Carry Out Emergency Repairs**

In February 2014, the Council was made aware that the Welsh Government was considering making grant available from its 2013-14 budget for repairs to coastal defences around Wales damaged by the December 2013 and January 2014 storms. Subsequently, the Council submitted a grant application for work to be carried out by the end of March 2014, amounting to £701,000. Separate funding of £254,324 was claimed as Tourism Infrastructure Grant to carry out repairs the promenade and other non-coastal defence features.