
PETITION TO COUNCIL – MARGATE HARBOUR

To: **Cabinet – 31st July 2014**

Main Portfolio Area: **Operational Services**

By: **Mike Humber – Technical Services Manager**

Classification: **Unrestricted**

Ward: **Margate Central**

Summary: This report discusses the proposals put forward by a petition and letter received in March 2014 concerning seaweed and sediment in the Margate Harbour area. The report discusses the disused harbour sluice and provides a summary of local coastal processes including the interaction with local maritime structures. The report also proposes the adoption of a recommendation that does not involve the re-opening of the closed sluice.

For Decision

1.0 Introduction and Background

- 1.1 On 24th April a petition was reported to Council containing 207 signatures and was focused upon sediment volumes and the potential nuisance caused by the odour from seaweed which settles in Margate Harbour. Due to its length a copy of the wording of the petition is attached to report as Annex 2.
- 1.2 The petition suggests that an easy solution to the sediment, seaweed, odour and associated nuisance is to reopen the sluice which passes through the stone pier. This report focuses upon the subject of seaweed and the sluice and the potential for its reopening.
- 1.3 The report also provides an overview of considerations relating to sediment volumes at Margate which are a fundamental factor in beach shape and the deposition of seaweed. The report draws on previous research undertaken in 2011 by Technical Services on this subject, as a result of works funded by the Environment Agency.

2.0 The Current Situation

- 2.1 Detached seaweed carried by tidal currents along the Thanet coastline is regularly deposited in the sheltered waters of Margate Harbour. As the tide ebbs the seaweed becomes stranded and decomposes over time. The smell of this decomposition is considered to cause a nuisance around the Harbour and often in the wider Old Town area. Year on year variations in weather affect the amount of seaweed that collects in the harbour, and the rate of decomposition. The disturbance of the sediment in the Harbour by mechanical plant is thought to exacerbate the smell issue due to the presence of degraded organic matter in the sediment itself. Some sampling work was carried out by the Environment Agency in December 2011 to analyse the sediment at various depths. The results of this work confirmed that organic matter is entrained in the sediment below

the surface. The anaerobic decomposition of this material is very likely to contribute to the odour associated with the seaweed at Margate.

- 2.2 Where accumulated seaweed on Thanet's shoreline is deemed to cause a nuisance it is mechanically removed and taken to farms just outside the Thanet area for agricultural purposes under licence by the Environment Agency. The maximum consented volume for this operation is 2762 tonnes per annum across Thanet. The seaweed must meet particular standards before it can be deposited under this licence. The seaweed which collects in Margate is often contaminated with sand and other material and therefore fails to meet this standard.
- 2.3 In 2011 Technical Services undertook study work as part of the Margate Flood and Coast Protection Scheme to investigate sediment behaviour in the bay at Margate and to look for practical solutions to the seaweed problem. A primary part of this work involved the evaluation of the effectiveness of reopening the sluice through the Stone Pier. Other options investigated included reducing the sediment level in the Harbour area so as to shorten the tidal window when the area dries and therefore reduce the length of time per tide that an odour is released.

3.0 Margate Bay and Harbour – Summary of Local Coastal Processes

- 3.1 Margate has for several centuries had some sort of pier or jetty to the east of the bay and at least two previous structures have historically succumbed to storms. In 1815 the existing Stone Pier was completed.
- 3.2 A small stone landing jetty which remains today was constructed in the mid 1800's to the west of the bay on the chalk reef (Nayland Rock). This jetty was constructed by the then Margate Harbour Company to act as a groyne to encourage sand to settle on the beach in the main bay which at that time consisted only of a small amount of stone and shingle. Throughout the 1800's the beach at Margate was fully submerged twice a day at high tide with deep water against the sea wall at Marine Terrace. In recent years the last time the tide even reached this sea wall was during the significant storm surge event on 5th December 2013.
- 3.3 The Stone Pier located at the east of the bay was designed as a safe haven for vessels but also acts as a groyne structure. The Stone Pier has a pronounced effect on coastal processes and significantly increases the capacity of the bay to trap and hold sand away from the natural sediment transport process. To the west of the bay the landing jetty also increases the capacity of the reef at Nayland Rock to stop more of the sand escaping westwards to Westbrook Bay.
- 3.4 In the 1930's Marine Tidal Pool was built on the Nayland Rock just to the north of the small landing jetty. This significant structure also acts as a groyne and significantly increases the capacity of the bay to hold sand.
- 3.5 Today the tidal pool along with the adjacent landing jetty and the Stone Pier across the bay all play a part in controlling sediment levels at Margate. Data has been collected on beach levels for more than 20 years in Thanet and this suggests that the beach volume at Margate has now reached a state of equilibrium after a long period of steady accretion due mainly to the existence of these man-made structures. It should be noted that the volume of sediment in the bay influences the position of the high water mark and therefore has a direct impact on Margate's flood defence provision. Indeed it is because of the level of the beach that the recent flood defence scheme did not need to extend further westwards onto Marine Terrace. Whilst the silting of the harbour may be considered to have a negative impact on navigation due to the accretion of material, the process has also produced a large positive attribute in the form of the wide sandy beach with its associated amenity value.

- 3.6 Sediment and sand at Margate could be reduced through major dredging activities subject to licence approval. This could reduce the odour issue by shortening the tidal window when the harbour dries out. However depending upon the scale of operations dredging could be an extremely expensive option which would require regular maintenance due to the continued influence of natural coastal processes. A larger and therefore more effective dredging operation could also compromise the amenity value of the beach and flood defence provision on Marine Terrace.

4.0 The History of the Sluice in the Stone Pier

- 4.1 Approximately 50m from the start of the Stone Pier there is a culvert (the sluice) constructed through the pier. The history of the sluice is not completely clear but it is thought that it was installed in the early 1800's not long after the stone pier was completed. This may indicate that sand accretion within the harbour was an issue from fairly early on in the Stone Pier's history.
- 4.2 It is likely that the sluice was installed with the intention of allowing the escape of silt from the harbour area. At low tide it was also used as a route to the foreshore outside the harbour for horse drawn carts loaded with sand from within the harbour area.
- 4.3 Conflicting information exists on when and why the sluice was blocked and the Council holds no records on this. The sluice may have been sealed as early as 1838 because it was found to be ineffective at reducing silt levels and was also the cause of unacceptably turbulent conditions in the harbour at high tide. However some anecdotal evidence suggests that it was blocked up in the last 40-50 years as a result of a serious accident involving a member of the public.
- 4.4 From inspection of the existing plug that blocks the sluice it can be seen that the material used (Portland stone) is almost identical to that used in the construction of the pier, (it is thought unlikely that Portland Stone would have been specified for this in the 1960's or 70's). There is however a smaller bricked section in the centre of the stone plug. This may therefore suggest that the sluice was sealed in the 1800's and then partially reopened in the 20th century for some time before being sealed once more. Such a scenario would fit well with the evidence that can be seen on site.
- 4.5 Photographs of the area and sluice are included in Annex 1.

5.0 The Effectiveness of Reopening the Stone Pier Sluice – Discussion

- 5.1 In order for the sluice to have any impact on sediment levels within the harbour, it would be necessary to generate a flow of water through this opening in the Stone Pier. The study work in 2011 looked in detail at the mechanisms which might cause sediment to leave the Harbour area through the sluice. These are summarised below:
- 5.1.1 **Bedload Transport** - This mechanism would require the sluice to generate a velocity sufficient to mobilise the sediment. A difference in hydraulic head of around 0.05m would be required for this. Whilst this does not appear to be a particularly significant difference in water level, when it is considered that this has to be achieved within a relatively short distance, i.e. between one side of the Stone Pier and the other it represents a hydraulic gradient of around 1 in 300. Such a gradient would require forcing factors such as waves or tidal flows, which can result in a 'set-up' of water levels. The required conditions for either of these external factors to cause sufficient set up do not exist in this location and the sediment will therefore not be removed as a result of this mechanism.
- 5.1.2 **Suspended Sediment Transport** - The transport of sediment suspended in the water column takes place at times when sufficient wave energy is present to agitate the seabed to an extent that the sediment is held in suspension. It is this process that causes the accretion of material in the harbour because the protected nature of this area means that there is no longer sufficient wave agitation of the seabed and thus the sediment falls out of suspension. The degree of agitation and tidal flow required to lift sediments into

suspension and then to transport them out of the harbour would require conditions that do not exist within the harbour. When the harbour was full of boats with hundreds of vessel movements during each tide this may have provided one of the mechanisms required (the agitation). However the negligible tidal flows in this area would have produced little flow of any potentially suspended material through the sluice.

- 5.1.3 **Localised Scour** – The likelihood of bed level lowering resulting from the local redistribution of material either side of the sluice was also explored. Bed levels are higher within the harbour than in the area immediately west of the Stone Pier. The distance between the inner and outer entrance to the sluice is around 15m and based on the vertical change in bed levels between these two points, it is possible to determine that the gradient of the seabed within the sluice would be around 1 in 15 (7%). This gradient is shallower than the natural angle of repose of this material and as such without any agitation of the surface, a flow of sand will not occur. However, the area immediately outside of the harbour is subject to focussed wave energy. In a similar fashion to normal alongshore processes, scouring of the sediments within the sluice could occur as the wave runs back out of the sluice. Whilst there will not be any significant net flow of water in either direction within the sluice, the fact that there is a physical gradient of the sand between the inner and outer ends of the sluice suggests that the mobilised sediment will migrate down the slope. Consequently, all of the time that there is a difference in the level of sand between the inside of the harbour and the beach on the outside, this mechanism has the potential to transport sediment from the inside of the harbour, through the sluice and onto the beach to the east of the Stone Pier.
- 5.2 The above suggests that the mechanism of localised scour may reduce sediment levels in the harbour via the sluice. It is likely that the re-opening of the sluice will result in a local lowering of bed levels in the immediate vicinity of the sluice opening within the harbour. However the volume of material moved will not be significant and the influence on seaweed in the harbour is likely to be very limited.
- 5.3 There are other issues to consider before reopening the sluice. Immediately outside the Stone Pier the foreshore is designated as a Special Area of Conservation, this designation refers to the internationally important chalk reef. The Habitat Regulations would require the re-opening of the sluice to be subject to the assent of Natural England as there is potential for an alteration to local coastal processes. The Stone Pier is grade 2 listed so the work would also require listed building consent. A marine licence from the Marine Management Organisation would also be required to undertake such works on the tidal foreshore.
- 5.4 An open sluice would represent a significant H&S risk to beach users. This risk could be mitigated by fitting steel grills on either end, the bars of the grills would need to be close enough together to stop unauthorised entry and robust enough to resist damage by floating objects, vessels etc. The grills would likely require regular cleaning to remove flotsam and weed and frequent inspection due to the high risks associated with the sluice. A method of closing the sluice during rough weather would be required. This would most likely be a hydraulic gate system on the external face of the Stone Pier. Without such a facility it might be possible for structural damage to the sluice and Stone Pier to occur and for unacceptably rough conditions to be experienced within the harbour area. An annual servicing budget would therefore be required to maintain the open sluice.

6.0 Options

6.1 Option 1 Continue with current management practice.

- 6.1.1 That Cabinet agree that the proposal made by the petition to reopening the sluice is rejected. This being on the grounds that study work undertaken does not adequately support the suggestion that opening the sluice would mobilise and reduce the impact of deposited seaweed. Furthermore it is likely that the source of the odour is not just

seaweed but also the anaerobic digestion of organic material in the harbour sediment itself.

- 6.1.2 This is the second summer season following the receipt of a licence by TDC to remove seaweed to farms in East Kent. This is a big step forward in controlling seaweed quantities as it reduces cost and increases opportunity for frequent removal. Deposited seaweed levels are monitored and removed periodically by in-house staff. This is a cost effective solution but tidal, weather and environmental restrictions can limit the timing of removal along with the need to work outside peak hours to avoid beach users. This year permission has also been granted by the Environment Agency for a trial operation involving the mechanical skimming of the seaweed in the harbour and its deposition outside the harbour wall. This is not in itself new but the focus of the trial will be to carry out this movement of seaweed on spring tides or during periods of strong offshore winds when the current/conditions are most likely to mobilise and dissipate the seaweed away from the bay.

6.2 Option 2 Re-open Sluice on trial basis

- 6.2.1 That Cabinet recommend to Council that the sluice is reopened on a temporary basis for a trial period. This could be for a period of one year, during which time beach levels and other coastal processes in and around the harbour would be monitored, along with the structural integrity of the sluice. The information gained over this period would then enable a much better informed decision to be made as to the long-term operation of the sluice. The temporary opening would require a marine licence, the installation of metal grills and the assent of Natural England, as well as listed building consent.
- 6.2.2 From the evidence on site it is likely that the sluice has already been reopened at least once in the history of the Stone Pier. The complex interaction of hydrodynamic and sediment transport processes, combined with the wide range of tidal and weather conditions that are prevalent at this location mean that it is not possible to predict the effectiveness of reopening the sluice with absolute certainty. The temporary opening of the sluice would cost in the region of £22k for the year long trial and would require careful management to mitigate local risk. Permanent reopening would require further funding (in the region of £65k) and an annual maintenance budget of approximately £7k.

7.0 Corporate Implications

7.1 Financial and VAT

- 7.1.1 The approximate cost of option 2 is indicated in section 6.2 above. The expenditure on seaweed removal around the whole Thanet coastline in 2013/14 was approximately £12k. This was mainly plant hire costs, and any costs at this location would be in addition to the current spending.

7.2 Legal

- 7.2.1 Licences are in place for current seaweed management activities. There are no known legal implications resulting from the recommendations of this report although consents are required with Natural England, the Environment Agency and Listed Buildings at the council before implementing Option 2.

7.3 Corporate

- 7.3.1 The odour that is apparently associated with seaweed at Margate has become a high profile issue in recent years. The issue has potential to damage corporate reputation and visitor perception.

7.3.2 The option to reopen the sluice carries with it H&S risk associated with the management of the open sluice and the protection of the public.

7.4 Equity and Equalities

7.4.1 There are no equity and equality issues associated with either of the options considered in the report.

8.0 Recommendation

8.1 It is recommended that Cabinet agree Option 1 as described in section 6.1 and reject the request to reopen the sluice gates.

9.0 Decision Making Process

9.1 This is a non-key decision that is within the delegated authority of Cabinet.

9.2 As the report follows a petition Cabinet's decision will be reported to a future meeting of Council.

Contact Officer:	Mike Humber, Technical Services Manager 01843 577083
Reporting to:	Mark Seed, Director of Operational Services

Annex List

Annex 1	Supporting Photographs
Annex 2	Petition Letter

Background Papers

Title	Details of where to access copy
Council Report - Petition to Council – Margate Port	Agenda Report Pack- Council 24 th February 2014

Corporate Consultation Undertaken

Finance	Matthew Sanham, Finance Manager (Corporate Finance Manager)
Legal	Steve Boyle, Interim Legal Services Manager & Monitoring Officer