

SUPPLEMENTARY PAPER A – TIDAL FLOWS AROUND PORT RAMSGATE

Consultation on the Port of Ramsgate High Level Feasibility Study

Produced for Ramsgate Regeneration Alliance 14/04/21

Reason for considering tidal flows:

The successful redevelopment of the Port and Harbour requires that as much of the resultant protected waters as possible be usable for the manoeuvre and mooring of vessels. Silting and swell in Ramsgate Port and Royal Harbour reduce this and therefore limit the scope for re-development.



The accumulation of silt in the Royal Harbour is a problem that has always been present to some degree. However, alterations in the 1970's to build the commercial port ("Port" or "Terminal") to the west have increased the problem and added the further difficulty of scavenging of sand from Ramsgate Main Sands and its deposition it in a westerly direction across the entrance to the Port.

Further, the design of the breakwaters to protect the Port has proved inadequate to stop swell in the Port when the weather is coming from the east. This has resulted in conditions too severe to offer vessels safe haven, with significant consequential damage to pontoons and vessels in the Port.

RRA's overall recommendations for the Ramsgate Port Master Plan include the repositioning of the Commercial Fleet from the present location in the Royal Harbour to the Port. This will free up the Outer Royal Harbour for more profitable use. Our recommendations also include a review of the Port and Royal Harbour moorings to accommodate a fleet of Tall Ships. Plans to repurpose the Outer Royal Harbour and the Port can only be realised by controlling silting and the swell problem, particularly in the Ramsgate Port Turning Basin.

Five main recommendations:

The present tidal impacts, resulting from the existing breakwater configurations, must be reviewed and new practical breakwater reconfigurations proposed. Here are four key recommendations for further hydrographical and engineering study and one regarding dredging facilities. These recommendations have been developed with

the assistance of local professional mariners and experts with a proper understanding of local conditions.

1. Movement of the breakwater currently extending south of Ramsgate Port Control on the East Pier, to reduce silting (particularly in the entrance), reduce swell in the Port turning basin under Easterly winds, and the scavenging of Ramsgate Main Sands.
2. Lowering of the Southern breakwater perimeter to the Port (with additional protection by detached moles to seaward), to reduce silting in the Port and possibly reduce swell.
3. An inner harbour (working title Haven) in the northern part of the Port to protect moorings for small commercial vessels.
4. Reinstatement in the Harbour Cross Wall of John Smeaton's eastern sluice gate, to assist dredging of the outer Harbour.
5. Return to the previous arrangement of a specific dredger assigned to Ramsgate, either through purchase or some sharing arrangement with another port operator.

1 Problems with the current Northern Breakwater configuration:

The existing breakwaters allow a significant swell in the Port when the wind is from the East. Additionally, the tidal action resulting from the existing breakwaters causes a significant redirection of silt into the Port and Royal Harbour with the result that low water depths are less than they should be. Repeated dredging is necessary.

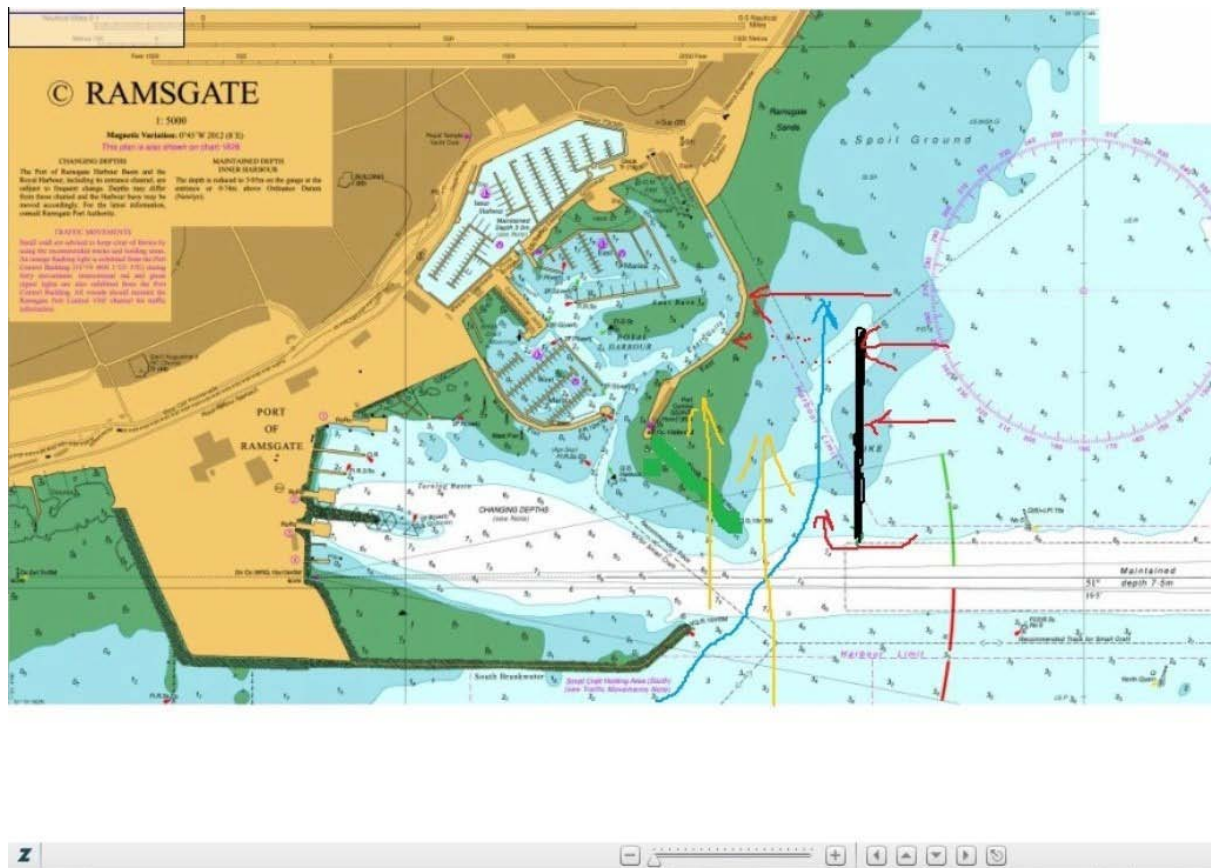
This tidal action also scavenges sand from Ramsgate Main Sands and moves it westward. This is having an ongoing negative effect on the amenity of the Main Sands which costs money to combat.

Proposed solution:

Remove the North Breakwater that projects to the south-east from the Ramsgate Port Control offices. This will reinstate a tidal contra-flow during periods of south and westerly winds which will reduce the scavenging of the Main Sands and the build up of silt in the port.

The East Pier of the Royal Harbour takes a pounding in strong easterly winds. The reflection of the waves off the wall creates a strong eddy transporting sand westward across and into the Port entrance.

A new detached mole should be installed running north/south to the north of the main channel and to the east of the Royal Harbour wall. This will reduce the flow which helps transport the sand south-westwards from the Main Sands and protect the port from swell during easterly winds. This is established technology, to the extent that the actual positioning of the mole can be calculated to produce maximum effect. Ron Blay (Master of the resident dredging vessel – Ramsgate - for 30 years) has contributed this sketch of the proposed alteration:



Justification for the proposed solution:

When the western extension to the port was originally built in the late 1970's local experts, including Ron Blay, were asked their opinion about the layout. This expert knowledge should be taken fully into account in setting plans to model changes to the Port and Harbour. Here are Ron Blay's recent words on the subject:

The harbour had a problem with sand in the first few years after it was finished, so Smeaton lengthened the East pier. This caused a set across the entrance and a strong flow around the east pier head that was quite effective. During severe NE gales there would be slight build up but that cleared with Southerly gales. But since the terminal has been built[there is] an increased tidal flow, causing a stronger anti-clockwise eddy, the two shingle banks east of the harbour have moved a considerable distance towards the west. The terminal, because it is so far seaward of the old harbour, has blocked the strong southerly gales from doing what they have always done that would drive the sand back, so causing the problem for our beautiful Royal Harbour.

.....

When Tom Bourne the surveyor was doing a survey for the ferry port builders I used the dredger and our Kelvin Hughes paper recorder sounder to help with the chart preparation for the new build. When the plans for the new ferry port were passed many local boatmen and myself voiced our concern at the change that a huge projection into the sea would cause [changes] to the long shore natural movement on the sea bed. As usual nobody listened. John Sey the harbour master at the time asked me if it would silt and I said the dredged channel would be kept clear but the berthing area would need a lot of work to hold the depth. His reply to me was: "The hydraulic research establishment has made a model and say it will not silt". [They were wrong.]

.....

I think [the North Breakwater] is doing more harm than good, as it trains the southerly swell towards the Royal harbour entrance. I show the new breakwater well outside of the southern breakwater. This would let large swell from a gale from the south drive up the back of the Royal East Pier, moving sand back [towards the Main Sands] as it always used to, plus letting tidal flow inside it to help cut the strong eddy formed by the ferry terminal,

Recommendation:

More detailed specification should be undertaken based on these insights, including hydrographical simulation, with a view to initiating the alterations. Costs would be lowered by using the existing stone in the Northern Breakwater and moving it to the new location.

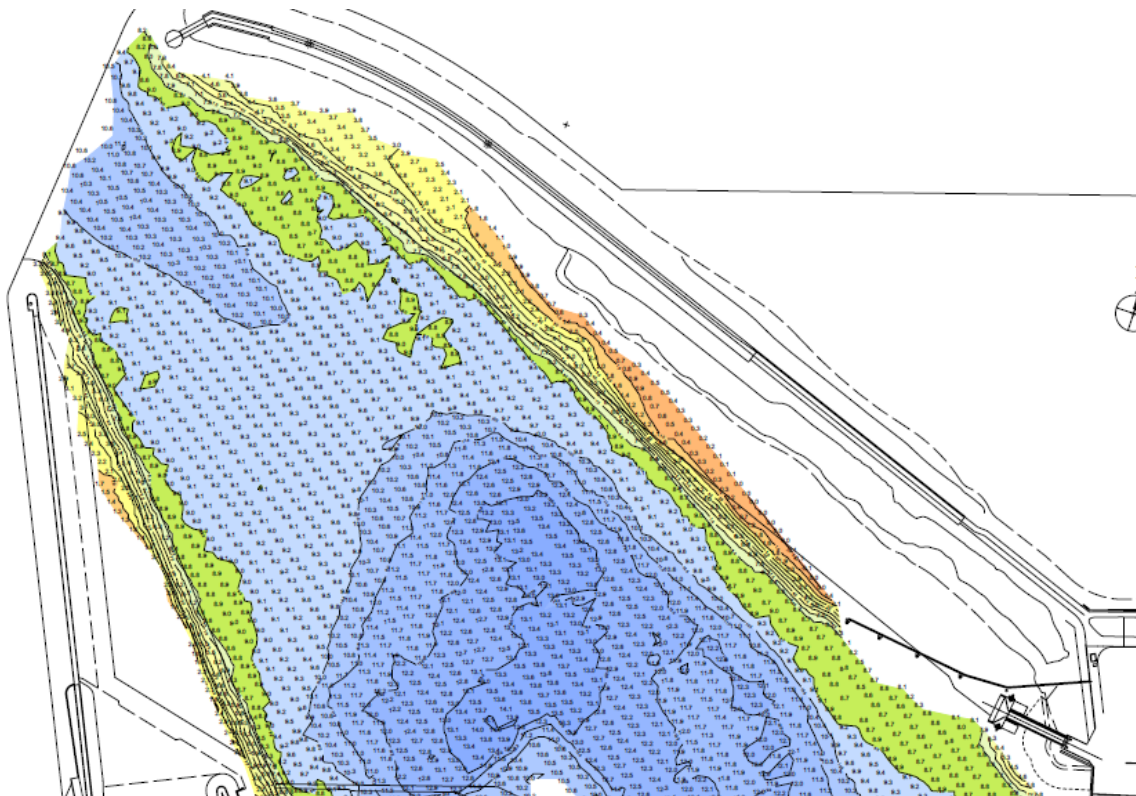
2 Lowering of the Port's Southern Breakwater:

Silting within the Port is a problem not just in the entrance but also in the turning basin, particularly in the south-western part. Alterations to the southern breakwater could alleviate the problem and also contribute to calming the swell problem when the weather comes from an easterly direction. The alterations would involve lowering the southern breakwater over part of its length to provide a cross flow, and protecting the gap(s) with detached moles to seaward. Here is evidence from Andy McCulloch (Channel Ferry Captain with forty three years experience at sea) drawing on his knowledge of a similar problem in Calais.

Written evidence from Andrew McCulloch

Until 1987 the Port of Calais was protected by two breakwaters. Both consisted of a rock base, with a top slightly above the level of LLWS and with a wooden walkway above. The breakwaters lie at right angles to the tidal streams and so sand carried on the tide was washed straight through and out the other side.

In 1987 the new East Pier was constructed, slightly to the east of the old one. This opened up the port for expansion but since the new pier was of solid construction using acropod blocks the tidal streams are now blocked in both directions. The west-going ebb tide deposited sand on the outside of the pier, thus building up the beach there. The east-going flood tide deposited sand against the inner face of the East Pier; a significant enough issue to require dredging at least twice a year.



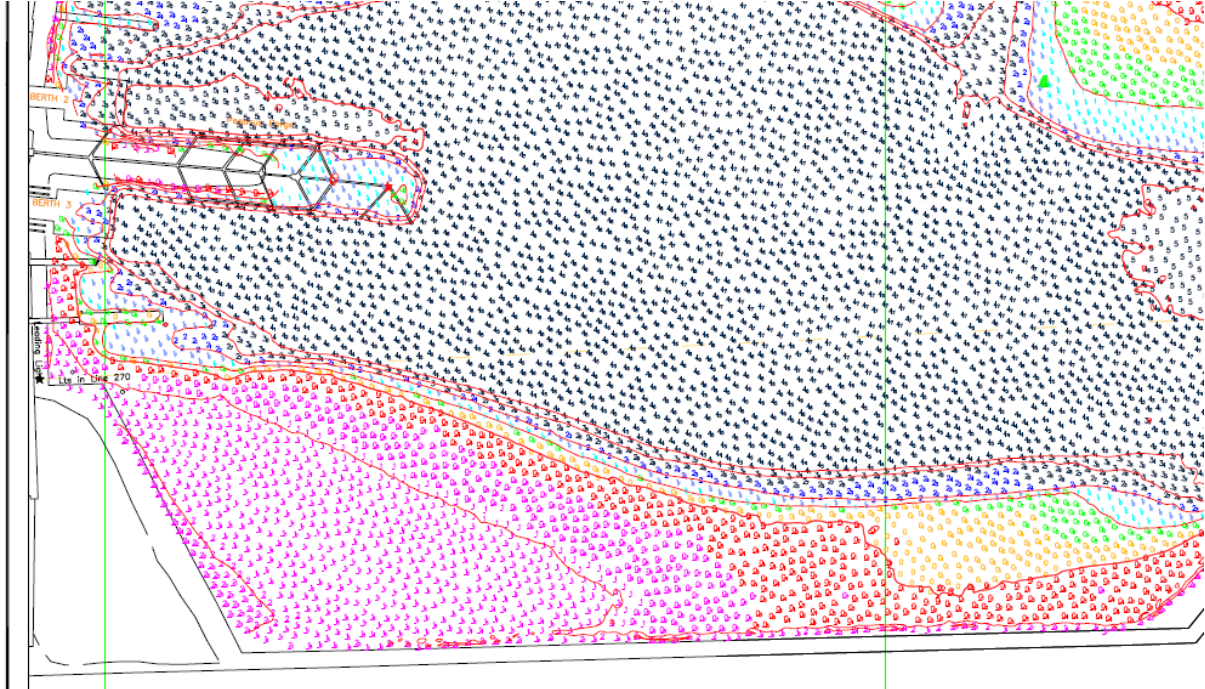
Calais West Pier



Calais East Pier



The same problem was created when the South Breakwater was built in Ramsgate. Sounding charts show that sand/silt accretion is greatest in the root of the Breakwater, where it meets the reclaim.



Allowing the south-going tide to move freely through the port and out through openings in the South Breakwater should help carry silt through without being deposited inside the port. An angled detached mole to the west of any such opening should go some way to preventing silt being carried in on the north-going tide: there is plenty of documentation regarding the positioning of such barriers.

The exact nature of such openings would need more expert investigation but I would suggest that the Calais West Pier could serve as an example: retain the foundations of the Breakwater and build a walkway over the gap created. Although the flood tide does wash over the foundations of Calais West Pier there is only a negligible tidal effect once inside the port, despite a strong current across the entrance. This would probably be the case in Ramsgate as well.

This is very much a preliminary idea and would need further investigation and costing but I think it worth considering.

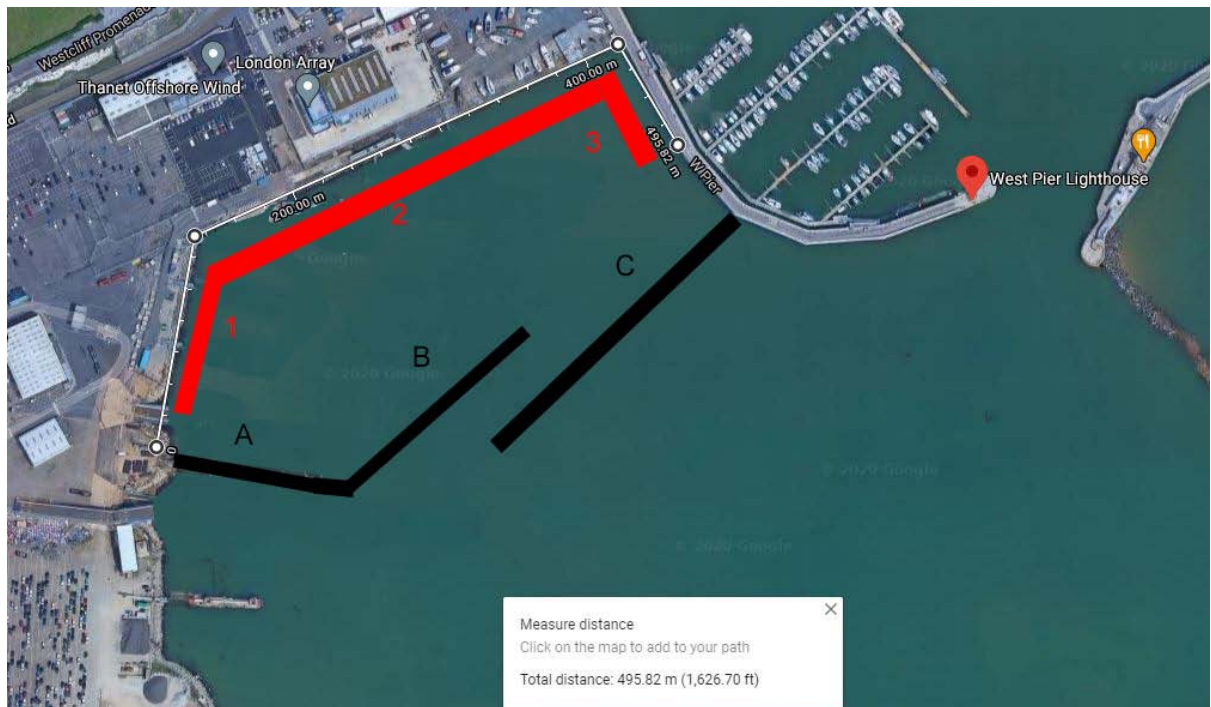


Recommendation:

More detailed specification should be undertaken based on these insights, including hydrographical simulation, with a view to initiating the alterations. Costs would be lowered by using the existing stone in the Southern Breakwater and moving it to the new location.

3 An inner harbour (working title Haven) in the northern part of the Port to protect moorings for small commercial vessels:

The most conclusive plan for providing swell free moorings in the Port involves the creation of a “Haven” at the northern end of the commercial port, with two breakwaters: one running south-eastwards from the root of No 2 berth and then turning north-eastwards and the other running in a south-westerly direction from near the entrance to the Royal Harbour opposite port control. The two NE/SW elements would overlap, thus providing shelter from wind and swell behind them and nearly 500 metres of alongside berthing for windfarm and other craft.



Notes on the above:

Historically the commercial port has suffered from serious siltation problems since the breakwaters were extended. In addition, it suffers from heavy swells within the port when winds are from the east.

There is now a proposal to relocate the windfarm support craft out of their present berths in the Royal Harbour.

- A. The new Haven will give a safe berth for all the windfarm support craft, with nearly 500 running metres of alongside mooring immediately adjacent to the two main windfarm depots.
- B. The Haven offers 350 running metres of alongside mooring outside Brett's possible 250m buffer zone.
- C. The Haven, subject to review and consent, could be in place by the beginning of 2022
- D. Construction will be relatively inexpensive

This will require the following works:

- 1. Demolition of No 1 Berth and the short finger berths between Nos 1 and 2 berths
- 2. Demolition of No 2 Berth

3. Removal of the upper linkspan and associated support structures from No 3 Berth
4. Survey and overhaul of the loading pontoon on No 3 Berth
5. Supply and positioning of berthing pontoons 1, 2 and 3 as shown in red above
6. Construction of three new breakwaters – A, B and C – as shown above (the exact location and overlap of B and C to be determined by more expert opinion)
7. The catwalk between Berths 2 and 3 can be demolished. Whatever replaces it (Breakwater A) will need suitable arrangements for the securing of ships using Berth 3
8. Breakwaters A, B and C. Construction can either be;
 - o Preformed concrete slabs located between pile driven steel girders, or
 - o A mixture of 20 and 40 foot shipping containers, filled with sand or gravel and sunk in position.

The above plan shows Berth 2 as demolished. If Berth 2 is retained then Pontoon A will be shortened by about 50 metres. Adequate provision must be made for mooring windfarm service vessels, preferably with alongside access to an overhead crane leading to warehouse facilities.

4 Reinstatement in the Harbour Cross Wall of John Smeaton's eastern sluice gate, to assist dredging of the outer Harbour.



In Georgian times, when John Smeaton first laid out what was to become the Royal Harbour, the problem of silting was addressed by two sets of sluice gates in the eastern and western ends of the harbour Cross Wall. The picture shows the outflow of the eastern sluice gate as it is currently.

The Cross Wall itself provides the southern boundary to the locked inner harbour. At times other than high water the difference in water level between the inner and outer (tidal) part of the Royal Harbour gives a head of water. This drove a strong flow of water when the sluice gates were opened, designed to clear silt out of the harbour towards the entrance.

The western sluice gate has been permanently sealed up. The eastern sluice gate still has its original mechanism in place, but it is inoperable and partially sealed up.

Recommendation:

It is recommended that the eastern sluice gate be reinstated for three reasons:

1. The current situation is potentially dangerous.
2. It would reinstate an important heritage of Georgian engineering.
3. It would assist the dredging of silt from the eastern side of the outer Royal Harbour.

The current state of the eastern sluice gate:



Here is a report on a visit to the eastern sluice gate on 25th July 2018, giving evidence of a need for urgent repair. To our knowledge the situation has not changed since then. So there is a strong case for remedial action as soon as possible.

“The sluice gate control gear is pictured in the.... image [immediately] above. It is located by the Cervia steam tug. The two sets of winding gear observable above ground are heavily corroded and look unusable in their present state. The manhole cover between the gates gives access to the workings below. Lifting the cover gave access to a loud sound of water rushing under pressure. It was bright sunlight and we could not see detail below, but there was an impression of fast flowing water at the

bottom of the pit. A powerful torch is recommended for further surface inspection. The sluice gate is leaking heavily.

We moved to by the inner harbour sluice opening next to Cervia. The sound of rushing water was clearly heard. Flotsam was moving in the direction of the sluice gates.

The flow of water from the sluice opening into the outer harbour shows a significant outflow [see picture at the start of this section, p10]..... It was about 2 hours before low water.

This flow.... is putting stress on the Cross Wall. The extent and nature of the damage can only be guessed. Detailed inspection will be potentially perilous and expensive. But it should be done. This is particularly the case because, as viewed from the slipways, there is ... evidence of subsidence of the outer Cross Wall over the East Gully sluices.

It seems reasonable to conclude that urgent action should be taken to assess the risk of a sudden exacerbation of the leak, which could result in the draining of the inner harbour marina.”

This inspection is open to repeat by the reader.

Evidence from Ron Blay indicates that the use of the sluice gates can help reduce silting in East Gully of the outer harbour by moving silt to a convenient place for a dredger to remove it.

However, further study is required to establish if modern dredging techniques are sufficient to warrant permanent blocking of the sluice rather than reinstatement.

5 Return to the previous arrangement of a specific dredger assigned to Ramsgate, either through purchase or some sharing arrangement with another port operator.

None of the evidence gathered for this report indicated that the problem of silting could be solved without regular dredging of the Port and Harbour.

Historically dredging costs for Port and Harbour vary significantly from year to year. An annual average around £300,000 for chartering-in would seem to be a reasonable comparator when considering alternative means of supply. However, disposing of the silt at the entrance to the port, accumulating as a result of the positioning of the Northern Breakwater, would cost an estimated further £100,000 per year (evidence from Ron Blay).

Recommendation:

As part of the Master Plan for the future of the Port, the options below should be investigated to identify possible cost reductions.

- Continue to charter dredgers
- Return to the ownership of our own dredger
- Sharing one with another nearby port operator.

The latest situation is reported as follows:

Kathy Bailes, Isle of Thanet News, 24th March 2024:

“Thanet council is offering a four year contract for dredging at Ramsgate Port and Harbour.

The authority wants to work to begin from June 1. A value for the contract has not been published.

Costs in 2013 for dredging amounted to £159,650.82 for the harbour and £41,422.39 for the port, making a total of £201,073.21. This was just half the cost of the previous year (2012) where the bill came in at £66,722.34 for the harbour but a whopping £396,070.50 for the port, making a total of £462,792.84.

In 2008 Thanet council sold its dredger [Ramsgate] for £66,000.

The new contract will be in two lots:

Lot 1. The Royal Harbour, including the marina finger berths and fairways and the approach to the Royal Harbour from the Turning circle of the commercial port. This is to be to a maximum target depth of -3.0m Chart datum.

Lot 2. The Turning Circle of the commercial port, the berths within the Turning Circle of the commercial port and up 250m eastwards of the breakwaters of the commercial port. This is to be to a maximum target depth of -7.5m Chart Datum.

Suppliers can bid for either Lot 1. or Lot 2. or both.

Thanet council states: "The contract is anticipated to commence upon 1 June 2021 for a duration of four years, with an option to extend by a further twelve months at the employer's discretion, unless terminated in accordance with the Conditions of the Contract."

Completed tender documents must be submitted electronically by no later than 3pm on April 15."

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