Burry Port Harbour

Non-Technical Summary Report

Dredging Options and Maintenance of Harbour Walls

Carmarthenshire County Council (CCC) /

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Notice

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1. Introduction

Burry Port Harbour has strategic importance to the area in terms of regeneration and economic potential. It is a critical site for Carmarthenshire's coastline and Wales' marine assets. If Carmarthenshire County Council (CCC) do not invest in a long term dredging and harbour wall maintenance programme, the harbour will struggle to survive as an asset. This will result in mooring holders leaving for other marina's which in turn will reduce the amount of income to both Burry Port Harbour and the wider community. This may also lead to a loss of interest for future development to the area. The harbour wall also carry a Grade II listing, which brings associated responsibilities on the authority.

Burry Port Harbour currently has development opportunities within the Llanelli Coast Joint Venture between the Welsh Assembly Government and Carmarthenshire County Council. This is a flagship partnership delivering an ambitious regeneration strategy for Llanelli Waterside. The aim is to create a vibrant and modern space in which people can enjoy working, living and playing.

The RNLI also continue to invest in the area with the construction of a new lifeboat station planned next year.

2. Purpose of report

To outline a sustainable maintenance plan for the Harbour, made up of two key elements:

2.1 Dredging

Dredging is necessary to:

- Remove around 80,000m3 of sand and silt from within the harbour as soon as possible, along with an ongoing, sustainable maintenance regime.
- Increase the depth of water in order to make access and egress for boats easier and keep them afloat during impoundment.
- Allow mooring fees to be increased again to maintain future revenue for the Harbour.
- Attract additional users to the harbour, increasing future revenue.
- Ensure a busy, vibrant harbour, which in turn can help regenerate the area.

2.2 Harbour Walls

The harbour walls must be repaired in order to:

- Meet the authority's responsibilities as owners of the Grade II listed facility
- Ensure the structural integrity of the walls are maintained and to prevent collapse.
- Ensure that the harbour is a safe place for boat users, harbour staff and the general public.
- Maintain the character of the Grade II listed walls and ensure they are preserved for the future.
- Ensure that the area of Burry Port attracts future development opportunities.

3. Dredging

3.1. Background

Since construction of the half tide gate and breakwater in 2000, the approach channel has experienced rapid infill of sand. The sand overtops the half tide gate and flows into the outer harbour. This sand settles out and accumulates in the harbour reducing the water depth, causing significant access and egress problems for boat users. The loss of depth also means that vessels now sit on the accumulated material during impoundment, which increases the risk of damage.

The harbour has not been fully dredged for 10 years, apart from localised mechanical removal of sand. The annual mechanical dredge is limited in terms of its effectiveness. The mechanical dredge removes approximately 6,100m^3 of sand from the outer harbour. This is at the lower end of the 6,000m^3 -10,000m^3 of sand that enters the harbour on an annual basis. The mechanical dredge does not remove silt that also gets in to the furthest reaches of the Harbour.

There is a need to remove 84,000m^3 of dredged material from the outer harbour (approx. 10,000m^3 sand and 74,400m^3 of silt) to reach a satisfactory level for the harbour to operate to its capacity.

There is currently no long term dredging strategy for the harbour which results in the sand and silt build up progressively getting worse.

3.2. Dredge and disposal options explored and dismissed

A number of different disposal options have been considered as part of the feasibility study. The options that have been discounted and reasons for are given in the table below. Refer to plan in **Appendix A**.

Discounted options Disposal of silt and sand:	Comments
1. Option 1 (i) Within West Dock	The harbour walls are Grade II listed status and infilling would prohibit future use as a dock.
2. Option 1 (ii) On development land adjacent to the harbour	The silt is unsuitable for re-use and the material will make development less attractive to potential developers.
3. Option 1 (iii) On Tip at Pembrey Harbour	This option will have a negative impact on the marine environment, the caravan park and requires waste permits which are costly and may take a number of years to obtain.
4. Option 1 (iv) b Disposal to sea to Swansea Bay disposal site L130.	Considered the best long term solution, but most expensive due to transport distance to Swansea Bay.
5. Option 2 – Restricted dredge	A reduction in marina capacity may not be desirable or produce the necessary revenues required for the harbour.
6. Option 3 – Removal of fingers	Potentially reduces the number of moorings, if located in channel. Cost effective solution, but does not solve the problem for the outer harbour.
7. Option 4 Revert to a tidal harbour by not operating the gate.	Harbour will still accrete sand, so costs for regular dredging will be required. Minimal cost solution, but does not solve the problem for the harbour. Does not resolve issue with maintenance of walls.
8. Option A Within East Dock	The harbour walls are Grade II listed status and infilling would prohibit future use as a dock.

3.3. Preferred Options

The preferred options, that are dependent on receiving a Marine Licence from Natural Resources Wales (NRW), are given in the table below:

Preferred Options Disposal of silt and sand:	Comments
9. Option 1 (iv) a Disposal to sea to the local disposal site LU145 / east beach site.	This is considered to be the best and most cost effective long term solution for the harbour by increasing the depth for boat users, but is dependent on receiving the marine licence for silt disposal from NRW.
10. Option B Water injection dredging (Trial)	This technique aims to remove a portion of the silt in the short term by using high volume water and the tide to flush the harbour. Recommend trial be undertaken for long term strategy.

3.4. Consultation with Natural Resources Wales (NRW)

Consultation has been undertaken with Natural Resources Wales (NRW) to ascertain the environmental requirements for the dredging and disposal options and the need for a marine licence. Feedback from NRW was positive, however risks were identified. NRW have raised the following risks and requirements:

- CCC can dredge as much material as required within their limits under the Harbour Revision Order (HRO) but are unable to dispose of the dredged material under Mean High Water Springs (MHWS). Therefore a marine licence is required for disposal.
- NRW are concerned about the adverse effect that the dredging could have on the cockle and mussel beds in the estuary.
- NRW stated there will be a requirement to model the discharge of silt and dispersion onto the local disposal site / East beach site to assess impacts on the cockle and mussel beds.
- Requirements needed to obtain a marine licence for the preferred option include submission of a Habitats Regulations Assessment (HRA), Water Framework Directive (WFD) assessment, and a Marine licence application with sampling and testing for CEFAS (Centre for Environment, Fisheries, and Aquaculture Sciences) requirements. Modelling required prior to these tasks.
- The local east beach discharge site has previously been used to dispose of sand only. A new disposal site may need to be characterised to determine its suitability for disposal of silt.
- There is no set timeframe for NRW to review and grant a Marine Licence.
- NRW fees are due to change in April 2017. All costs are based on NRW current 2016 structure.
- A separate HRA and WFD will be required for the main dredge option to the local site / East beach site and for the long term strategy using Water Injection Dredging (WID).
- SSSI ascent required will be covered under the Marine Licence.
- A Marine licence application for the sampling in the harbour at depth may be required.

3.5. Long Term Strategy

A more frequent mechanical dredge will be required to the approach channel to try and reduce the ingress of sand into the outer harbour. In addition to this, another suitable technique, such as Water Injection Dredging, or similar will be required on a regular basis to maintain the appropriate level in the harbour. There will be a need for future regular monitoring in the form of bathymetric surveys to monitor the sand and silt levels.

4. Harbour Walls

4.1. Background

A visual inspection condition survey has been undertaken to confirm the condition of the harbour walls and to identify potential defects.

Outer Harbour – The majority of the Outer Harbour consists of sloping battered masonry walls, which are believed to cover the original unstable vertical walls. The walls are in reasonable condition, however the North East and East walls are designated as **High priority** repairs that require repair in the next 1 – 2 years. Here there are defects in areas beneath the existing access brows and adjacent to the footpath that are used by the general public and boat users

East Dock – The majority of the masonry walls on the East Dock are in a dilapidated condition and will require a substantial amount of money to repair these in order to make them safe. It is understood that a new development will take place to the East side of the East dock. For this reason the repairs have been designated as **High priority** and are mainly concentrated on the East Side of the dock.

We do not recommend infilling the East Dock with dredged material as we believe that this is an asset that can be used for future expansion of the Outer Harbour and allow creation of a fixed water body that will be vital in the redevelopment of the waterside.

West Dock – The majority of the dock consists of sloping banks made from copper slag, with the remainder being masonry walls. The majority of the banks / walls are classified as medium to low priority repairs. **High priority** repairs are required to walls adjacent to the new children's playground to the west of the dock entrance.

We do not recommend infilling the West Dock with dredged material as we believe that this is an asset that can be used for future expansion of the Outer Harbour.

The walls show signs of distress and would benefit from site investigations in the form of boreholes to determine the reasons of distress.

4.2. Consultation with NRW and Conservation Officers

Consultation with Natural resources Wales (NRW) and Carmarthenshire conservation officers has confirmed the following:

Natural Resources Wales (NRW) - noted that any works that are undertaken under the powers of the Harbour Act and within or close to a Site of Special Scientific Interest (SSSI), such as the repairs to the walls may require a SSSI ascent because of the potential for bats in the crevices of the walls and presence of otters.

Carmarthenshire County Council's conservation officer - advised that the harbour walls are Grade II listed and a Listed Building Consent (LBC) will be required for any works which affect the character of a listed building (exterior, interior, any curtilage structure) and such works would include demolition, extension, alteration and possibly even repairs. The conservation officer has also noted that in his opinion a LBC for infilling of the East Dock with material dredged from the outer harbour is unlikely to be granted.

5. Key issues, Risks and Unknowns

5.1. Dredging

The key issues, risks and unknowns with the preferred dredging options are given below:

Option (iv) a – Discharge to sea to local discharge site LU145 or east beach site.

- Dredging's disposed to the designated disposal site (LU145), located directly outside the harbour entrance is more likely to be re-transported back into the harbour over time, than if deposited at the site defined in the 2010 disposal licence which is located further to the east and will reduce the risk of deposited material coming back into the harbour.
- Disposal site LU145 and the east beach site defined on the 2010 licence have historically only been consented for sand and not silt.
- There may be a need to designate a new site for disposals of silt (as only now for sand).
- Risk that the licence for disposal silt won't be granted because of the environmental sensitivity.
- No set time scale given by NRW to review and grant the Marine Licence for the works.
- NRW fees are due to change in April 2017. All costs are based on NRW current 2016 structure.
- Sand disposal will still be required as per the existing exemption.
- Confirmation and evidence of consents or exemptions in place for the placement of sand at the top of the beach disposal site.
- The daily discharge volume to the local discharge site and east beach site may be restricted on environmental grounds.
- The time of year that disposal can be carried out may be restricted on environmental grounds.

Option B – Water Injection Dredging (WID) trial for long term strategy

- WID needs a trial to confirm suitability for use as a long term solution or removing the silt fraction.
- WID only dredges part of the harbour. The rest of the harbour is expected to have too high a sand content to be effective.
- Initial indication from NRW is that no licence required for WID of silt. However, supply of HRA and WFD assessments to fulfil Harbour Authority responsibilities and NRW approval is required.
- The daily discharge volume that can be undertaken by WID may be restricted.
- Time of year that the WID can be carried out may be restricted on environmental grounds.
- Sand disposal will be required as per existing exemption.

5.2. Harbour Walls

The key issues, risks and unknowns with the walls are:

- It is unknown if a Listed Building Consent (LBC) will be granted for the wall repairs.
- It is unknown if a SSSI ascent will be granted for the repairs.
- There are no as built records or construction details of the existing walls available.
- There are no ground investigation records available.

5.3. Do Nothing

If CCC do not invest in a long term dredging scheme and maintenance programme for the repair of the harbour walls the harbour will not survive as an asset. Implications of doing nothing are as follows:

- Ingress of sand and silt in the harbour will progressively get worse making access and egress for boats more difficult.
- Will result in leisure craft leaving for other marina's which in turn will reduce the amount of income.
- Could result in the closure of the harbour due to safety of boat users.
- This will lead to loss of interest for future development and expansion and could contribute to deprivation to the area.
- East dock will remain closed due to instability of the walls.
- Reduces further expansion of outer harbour into the East and West docks which has the potential to increase revenue.
- The Grade II listed harbour walls will also not be preserved.

6. Costs

6.1. Dredging Costs

Estimated likely budget costs for the main dredge option to discharge to the local beach disposal site, East beach and the trial of the Water Injection Dredge have been provided. These costs include for the professional fees required for the lengthy scheme surveys, modelling and assessment process required to gain the Marine Licence. Further budget cost estimates have been provided for the long term strategy.

	Discharge to sea using CSD to local beach site LU145 / east beach site Option (iv) a	**Water Injection Dredge Trial (13,500m^3)**	**Water Injection Dredge Option B (if trial successful)**	**Long Term Strategy**	
				Annual Mechanical Dredge (two times a year)	**Water Injection Dredging (every 2 years)**
Construction costs to remove sand, silt and Marine Licence fee	£475,000	£225,000	£420,000	£100,000	£120,000
Vibro-coring and testing	£20,000	-	-	-	-
Professional fees for Marine License and consents requirements	£70,000	£60,000	£60,000	£10,000	£10,000
Costs of survey to support modelling	£85,000	-	-	-	-
Professional fees modelling	£80,000*	£25,000 (with model already built)	£25,000 (with model already built)	-	-
Design support, tender, PM and supervision	£50,000	£20,000	£35,000	£10,000	£14,000
Dredge Option Total	**£780,000**	**£330,000**	**£540,000**	-	-
Professional fees for long term strategy	-	-	-	£10,000	£8,000
Future bathymetric monitoring surveys	-	-	-	£10,000	£8,000
Total every 2 years	**-**	**-**	**-**	**-**	**£160,000**
Annual Maintenance Total	**-**	**-**	**-**	**£140,000**	**£80,000**

Table 1. Summary of estimated budget costs for dredging

Note. The costs for the consents are based on NRW current structure. These are due to change in April 2017.

The WID trial costs are high due to the initial mobilisation of the equipment to site.

*Cost to build a new model of the estuary and harbour which could then be used and recalibrated for other dredging options, e.g. WID.

6.2. Wall Repair Costs

Estimated budget costs have been provided for the high, medium and low priority repairs that require repair in the next 1 to 2 years, 2 to 5 years and 5 to 10 years for the Outer Harbour, West Dock and East Dock. Costs have also been provided for the investigations required and inspection cost required on an annual basis.

The costs are based on Contractors rates for similar types of repairs works in harbours such as Milford Docks. The costs (including professional fees) are summarised in the table below:

Location	Cost of High Priority Repairs (1-2 years)	Cost of Medium Priority Repairs (2 – 5 years)	Cost of Low Priority Repairs (5 – 10 years)	Cost of all Repairs (H,M, L)	Cost of Investigations for High Priority Repairs	Cost of Annual Inspection
Outer Harbour	£130,488	£447,197	£469,228	£1,046,912	£71,500	£2,200
West Dock	£84,665	£341,430	£155,548	£581,644	-	£1,760
East Dock	£460,299	£216,145	£175,331	£851,775	£89,375	£1,540
Consents	£25,000	£25,000	£25,000	£75,000	-	-
Principal Inspection	-	£20,000	£20,000	£40,000	-	-
Grand Total	**£700,452**	**£1,049,772**	**£845,107**	**£2,595,331**	**£160,875**	**£66,000**
Scheme Total	**£2,822,206**					

Table 2. Summary of estimated budget costs for walls repairs

7. Recommendations

7.1. Dredging

Main dredge - Discharge to sea using CSD to local site LU145 / East beach site (Option (iv) a)

- Start the modelling and consenting process for the main dredge option as soon as possible as this requires surveys, computer numerical modelling, HRA and WFD assessments and Marine Licence application. A process that can take at least 12 months.
- Verify suitability of local disposal site (LU145) and east beach site (2010 licence) for disposal of silt as these are currently only for sand.

- Produce Marine Licence consent application site coring investigation.
- Take core samples of sand and silt in the outer harbour using a vibrocore from a boat to inform the dredging contract documents and to provide more cost certainty on actual material to be removed.
- Undertake testing of silt and sands for contamination testing to reduce risk.
- Grant funding options to be explored by the Council to fund the scheme.
- Undertake further consultation with NRW to confirm modelling requirements.

Long term strategy – including the Water Injection Dredge Trial (Option B)

- Integrate the longer term maintenance plan into the wider strategic master plan for the harbour area as a whole.
- Progress the requirements for the long term dredging strategy and WID (to include HRA, WFD).
- Compile and develop a long term dredging strategy to follow on from the initial dredge campaign. This will be required in support of a license application.
    - Survey and monitor the infill rates on a regular basis following sand extraction campaigns, especially outside of the harbour.
    - Undertake trial of WID for silt removal to confirm suitability for long term strategy following removal of sand by present mechanical.
    - Undertake more regular mechanical sand dredge campaigns to reduce the sand levels in the approach channel.

General

- CCC to explore possibilities of using / selling sand from the harbour.
- CCC to allow a contingency on top of NRW marine licence fees as these are due to increase in April 2017.
- CCC to allow a contingency on top of the costs provided to allow for dredging and disposal of a greater volume of material, as the levels in the harbour are likely to increase if the dredging period is to be at least 12 months into the future.
- Consider use of WID to remove some material from the west dock.
- Consider relocating east dock pontoons to west dock area created by WID.
- Consider retaining and development of the west dock asset as a more beneficial feature to sustain the life of the harbour. This will generate additional revenue.
- Explore disposal of material at the existing Swansea Bay (LU130) disposal site as a longer term solution.

7.2. Walls

For the harbour walls we recommend the following is undertaken:

- The high priority repairs are repaired within the next 1 to 2 years to ensure Health and Safety concerns with the harbour are addressed and to maintain the structural integrity of the walls.
- Apply for the Listed Building Consent (LBC) application and SSSI ascent to allow the wall repairs to be undertaken.
- Undertaken further site investigations on the high priority repair areas to determine the reasons for failure.
- All walls are inspected on an annual basis to ensure that there is no further deterioration or risk to the general public and boat users.
- An annual inspection and maintenance repair scheme is adopted for the walls to ensure that the overall integrity of the walls are maintained and to attract future development for the area of Burry Port.
- CCC to explore avenues of funding to repair the historical walls by Heritage Lottery grant funding or similar
- All other structural items within the harbour shall be inspected. These being, but not limited to: pontoons pile guides, access brows, access ladders, outfalls, penstocks, sheet piles and associated mechanical and electrical items.
- A Principal Inspection is undertaken every 5 years.
- Apply of the SSSI ascent from Natural Resources Wales (NRW) to allow the wall repairs to be undertaken.
- Install a wall identification and chainage marker system on the walls to allow for easy identification and comparison with future wall inspections.

Appendices

Appendix A – Plan of Burry Port Harbour