Port William Harbour Main Basin Maintenance Dredging
Best Practical Environmental Option Assessment

Prepared by:

Will Jones, Regional Harbour Master

Dumfries and Galloway Council

Harbour Master's Office, Harbour Square, Kirkcudbright, DG6 4HY.
[Redacted]

March 2023

1 Introduction

1.1 Background

Dumfries and Galloway Council is the Statutory Harbour Authority for Port William Harbour. The Council is seeking permission to undertake maintenance dredging in the harbour entrance and alongside the quay to remove excess material which builds up alongside the main quay wall. The harbour is WNW facing and material is washed into the harbour during gale conditions. At times a bank can appear overnight in the entrance following severe weather. The work is necessary to maintain depths alongside the quay to allow the home static gear and visiting boats to berth alongside.

Occasional work at the head of the harbour is required to remove decomposing seaweed which reduces depths in an area of the harbour used for vessels to take shelter in bad weather. The smell of the seaweed is also unpleasant in the centre of this small town and detracts from its tourism. Dredging work is therefore essential.

The dredging work is planned to be undertaken by land-based excavators supported by dumper trucks or tractor/trailer combinations. The work is feasible 2.5 hours either side of Low Water on the harbour bed and takes around 6 tidal windows to complete. Operations can be completed in shorter timeframes when the back of the harbour is not needing dredged.

This assessment will consider the alternative options available for disposal of the dredged material.

In order to obtain a licence for the deposit of materials it is necessary to undertake a detailed assessment of the alternative options, together with a statement setting out the reasons which have led to the conclusion that disposal of the dredgings outside of the harbour for natural dispersal is the Best Practicable Environmental Option (BPEO).

This BPEO is submitted together with the application for disposal at sea as required by the Marine (Scotland) Act 2010 to Marine Scotland Licensing Operations Team.

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The location of Port William Harbour is shown in Figure 1.

Port William Harbour Maintenance Dredging
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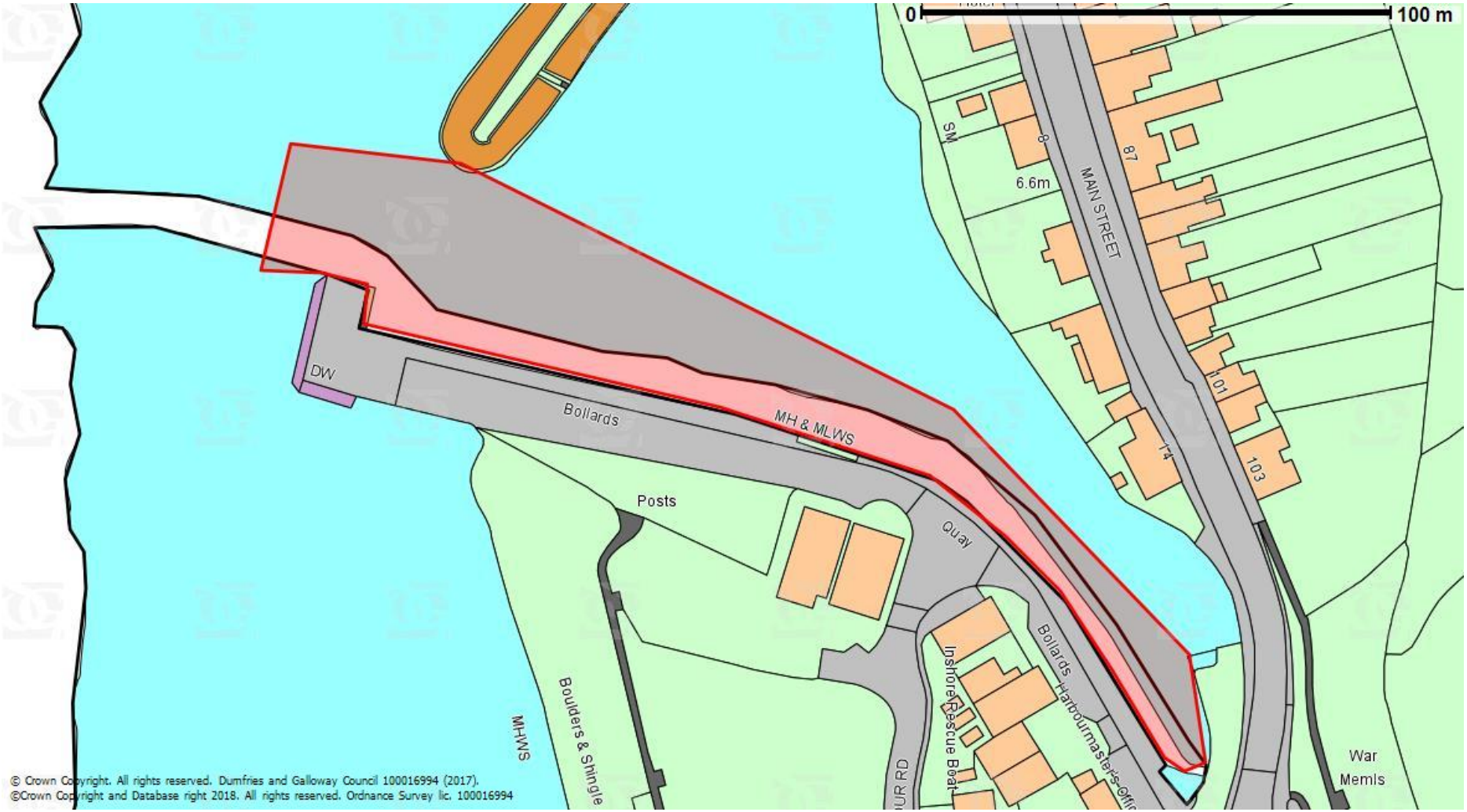
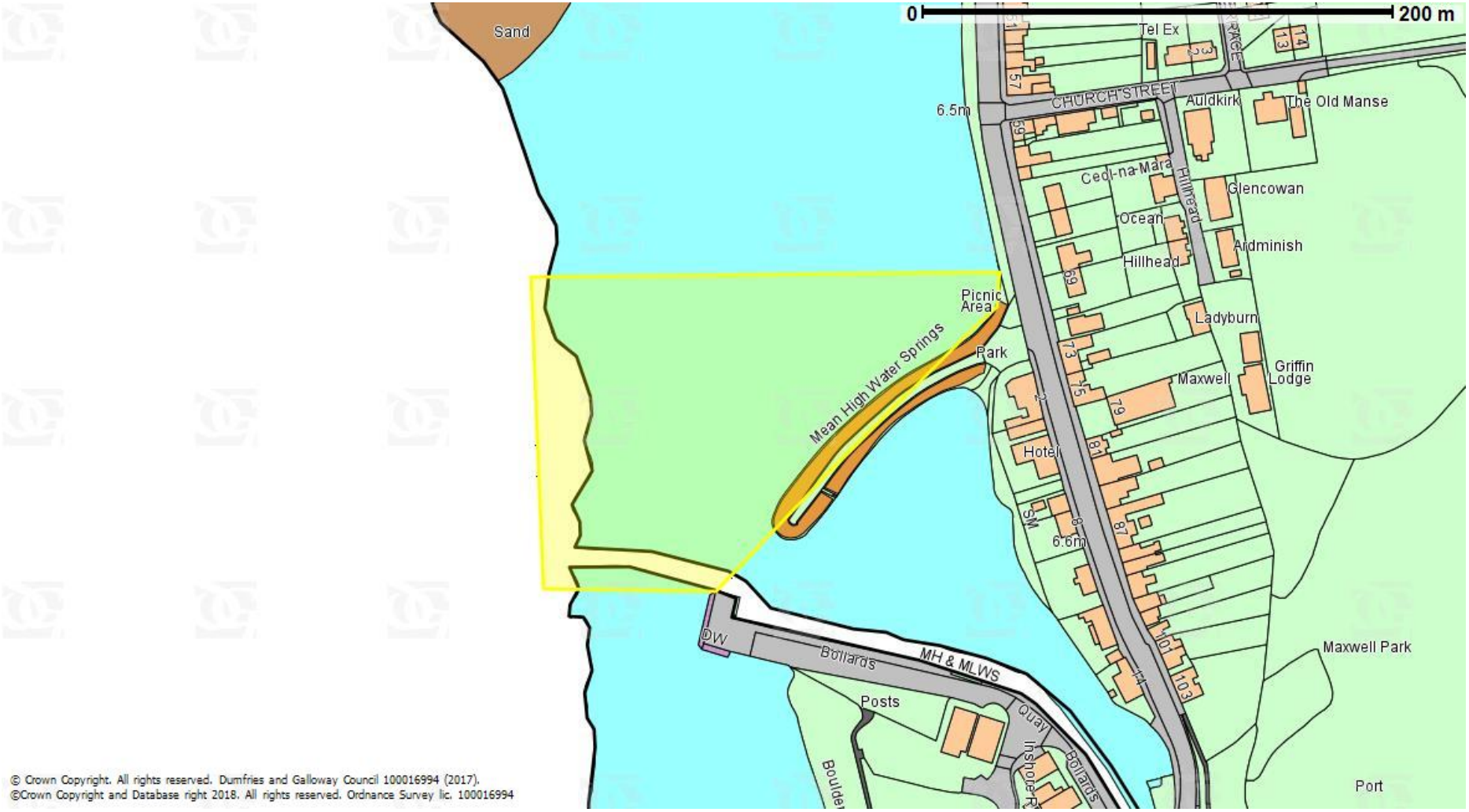
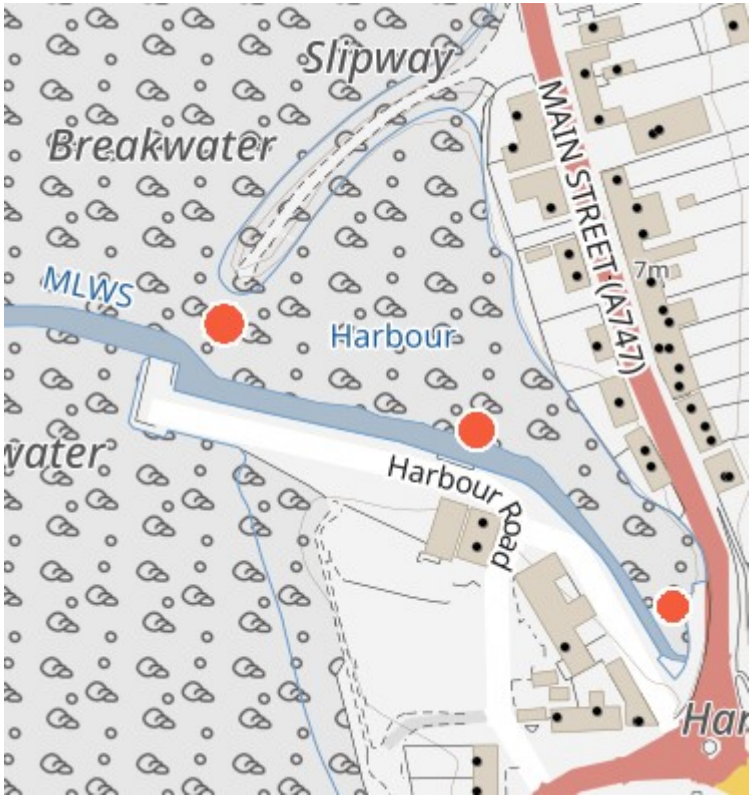
The Dredge Area is indicated in Figure 2 by the area shown in red.



The proposed Disposal Area is indicated in Figure 3 by the area in yellow.



Samples for analysis were taken by way of grab samples up to 1.0m deep at locations marked in red on Figure 4.



1.2 Dredging Works

As the Statutory Harbour Authority we have powers to dredge under the Dumfries and Galloway Council Harbour Empowerment Order (Port William) 2008. We do not have the powers to dispose of dredgings and as the Statutory Harbour Authority it is incumbent upon us to obtain the required consents.

It is proposed to remove material up to a depth of 1m alongside the quayside with dredging depths. Analysis indicates depths to be between 0.4m and 0.7m with seaweed up to 1m at the SE section of the dredging area. Sand and seaweed build up may require maintenance dredging to be undertaken as frequently as every twelve months.

It is proposed that the work will continue to be carried out by land-based excavators operating 2.5 hours either side of Low Water over 3-6 tidal windows depending on the scope of the works. Work should be scheduled for large spring tides to provide the longest and safest dredging window.

Vessels will be instructed to avoid berthing over Low Water during dredging works or moved accordingly to allow the work to be undertaken as quickly and safely as possible.

The total amount of material to be removed is estimated at up to 10000 wet tonnes per annum.

1.3 Source of Materials

In gale conditions a bank up to 1 metre deep can form suddenly in the harbour mouth which prevents vessels accessing the quay during the required window 2.5 hours either side of High Water. Bad weather also forces excess sand and seaweed into the harbour and, with no natural

water throughput of water, the seaweed collects at the head of the harbour, where it decomposes and pervades a very strong odour, particularly over the summer months.

1.4 Material to be disposed.

The previous licence (# 06732) allowed for the removal of up to 10,000 wet tonnes per annum. This would again be the requested annual disposal allowance for this application.

Three samples were successfully collected and analysed on 28 April 2023 by IKM Consulting Ltd. These were submitted to SOCOTEC for analysis in line with the requirements of Marine Scotland and IKM's report is being submitted as part of the overall application.

All sample results were found to be below the action level AL1 concentration, apart from some small exceedances for copper, zinc, cadmium and nickel. A copy of the analysis report has been submitted as part of our overall application and should be referred to for the comprehensive test results.

1.5 Scope of the report

The purpose of this document is to review the available disposal options for the dredged material, to assess the viability and cost effectiveness of those options and to determine the Best Practicable Environmental Option (BPEO). Disposal options will be considered against their environmental suitability, strategic benefit, health and safety, and cost. The report will be structured as below:

Section 2 – Available Options

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Section 3 – Options under consideration

Section 4 – Conclusion and rankings

Section 5 – BPEO

2 Available Options

This section outlines the disposal options that will be considered as part of the BPEO assessment. Where an option is deemed impractical, justification for this will be provided and the option will not be progressed further.

Due to the location of the harbour in the very centre of Port William any option involving the removal of the material by road to a suitable disposal site would have a very detrimental effect. All lorry movements would be along the main A747 or B7085 and past a large part of the village's residential area as well as disrupting adjacent villages on any disposal route. Due to work being scheduled to coincide with large Spring Tides work would have to commence early morning (circa 0600) and end late evening up to 2300. Up to 500 heavy lorry movements would be required to move up to 10,000 wet tonnes and operating at these times would cause noise disturbance to much of the population.

Loading of the lorries from the harbour bed would also require long reach excavators with smaller buckets and it is estimated that work would therefore require in excess of 6 tidal windows to complete, further impacting on harbour operations and nuisance to residents. Long reach excavators operating on the quayside would also present higher safety risks to the general public and harbour users who normally have free access to the quayside.

The risk to Public Health and Safety including physical injury, noise, dust and air pollution in conjunction with low levels of public acceptability preclude any options requiring use of road transport.

It is recommended, therefore, that road transport-based options including land Incineration, landfill and soil conditioning are not progressed.

2.1.1 Coastal Protection

The material could be used wider afield within the Solway Firth estuary. Assessment of coastal protection requirements has been made using the National Climate Change Assessment Tool from Mull of Galloway to Gretna (Cell 7) which identifies sites under threat of erosion up until 2050. There are 7 residential properties under direct threat by 2050 at Southerness. Whilst the sand spoil from Port William could possibly be

used, the watery seaweed from the head of the harbour would not be suitable. Southerness is located in an area of the Solway Firth some 40 nautical miles away where there are expansive areas of shallow water and drying mudflats which would make it impossible to access with the grab dredgers vessels to deposit the material.

There are SSSI's at:

Monreith Bay (SSSI # 9326)

There are areas on the Inner Solway where the fine material could be used to protect habitat such as salt marshes etc. but it is unsafe for vessels to navigate the very shallow depths further up the Solway.

This option for disposal has been discounted.

2.1.2 Sea Disposal

There is no local licensed sea disposal site available, there is, however, a registered sea disposal site at Beaufort's Dyke in the North Channel. Operations involving Beaufort's Dyke would be heavily weather dependant and involve passage around the severe tidal gate at the Mull of Galloway where overfalls and adverse sea conditions are prevalent.

It would be preferable to make an application for a new sea disposal site within the Solway Firth. To minimise travel distances this would be in Luce bay west of Port William and outside of the 10 m contour. The strong tides would be very effective at dispersing the spoil.

The harbour at Port William is accessed via an entrance only 30m width and dries throughout.

Any vessel must be able to take the ground given the harbour dries outside of HW+/-2.5 hours. UK Dredging grab hopper dredger Cherry Sand is unable to take the ground and would have insufficient depth to operate.

Wyre Marine operates a smaller grab hopper vessel the Admiral Day which would be more suited as she is able to take the ground. Care would be required to ensure Admiral Day was able to sit on a level dredged part of the harbour to avoid breaking her back. She would be able to remove only 250 m3 of spoil each day requiring up to 20 days to complete the work. This would create serious disruption to the harbour and incur cost disproportionate with the harbour operations. The additional costs as set out in the Cost Analysis at section 3.3 make it financially unviable.

2.1.3 Natural dispersal by way of plough dredging

It would be feasible to undertake clearance by way plough dredging operating from a work barge, with spoil ploughed out to beyond the Low Water Springs line. There is however no natural depression outside of the harbour and there is a likelihood that the material would sit and be washed back in. It is challenging to plough dredge to North or South of the harbour due to the boulder strewn shoreline.

There would be some noise and air pollution from any vessel conducting the work. The work would be programmed to be undertaken during daylight hours only, so as to minimise disruption to the public. The operation would result in an increase in NO_2 and airborne particle matter (from exhaust), this would be negligible when compared to the background pollution already present from road traffic operating in the centre of Port William.

Levels of contaminants within the dredged material will be no different from those associated with those outside of the harbour. This option will provide a low environmental impact, with the spoil being disposed of in its natural environment. It is not anticipated that there will be any significant impacts on ecology (flora and fauna). Consideration should be given to the additional pollution during deployment and work at site.

Overall, this would be an environmentally acceptable option given the immediate proximity of a disposal location.

The work would impact more heavily on the small fishing fleet which would have to operate around any dredging vessel. Suitable notice would be given to both home vessels and visitors by way of Notice to Mariners and VHF broadcasts.

As the work will require contractors external to Dumfries and Galloway this may be viewed as detrimental by local elected members and residents.

Vessels would be operating in a narrow channel with associated risks of collision, contact or grounding. Moreover, the operating vessels UKD Sealion is not able to take the ground. This would mean having to operate daily from either Workington, Whitehaven or Douglas, Isle of Man.

Costs for plough dredging with Wyre Marine Services are quoted at £11.40/m3 equating to £57,000 and this level of cost is financially unviable.

2.1.4 Land-based excavators.

This technique has been used very successfully in the past for small dredging operations at the harbour. 2 x 360 excavators are used to load the material to be dredged in to 3 tractor and trailer units which ferry it out through the harbour mouth and round the corner northwards to the disposal area (fig 3, pp7) All this machinery can operate 2.5 hours either side of Low Water whilst the harbour is dried out. Work would be scheduled for large spring tides to provide the longest dredging window.

Fishing vessels would be inconvenienced as they would have to berth according to the work schedule over Low Water to allow the work to be undertaken as quickly and safely as possible. They would, however, be able to operate as normal over High Water +/-2.5 hours. Suitable notice would be given to both home vessels and visitors by way of Notice to Mariners and VHF broadcasts.

The excavators can visually target the dredging areas and therefore achieve a high-quality result; a very level harbour bed down to hard bottom providing the maximum depths for the fishing vessels to operate over and to lie safely aground alongside the quay.

Employment of contractors from within Dumfries and Galloway is viewed positively by local elected members and residents.

This disposal method results in the low environmental impact to Port William and its residents given the small amount of equipment in use and familiarity with this method of clearing the harbour. This method involves short deployment distances and the shortest dredging period of all options.

This is an environmentally acceptable option. The impact on the natural environment from this option is identical those stated in section 2.1.3. This option again provides a low environmental impact, with the spoil being deposited within its natural environment of Luce Bay and being dispersed by natural means. This method has been an accepted method from historical dredging operations at Port William harbour.

Costs of £ 5000 per dredge are very low when compared with other options and this is important. Significantly higher dredging costs associated with other options would not be financially acceptable given the low income levels at this harbour.

This option is viable environmentally, operationally and financially; and will be explored further in Section 3 – Options under Consideration.

2.1.5 Do nothing approach

The current rate of build-up of material necessitates clearance up to annually, particularly in the harbour mouth after northerly vector storms which push material into the harbour.

Whilst Port William is a small harbour it supports the local static gear fishermen who form a vital part of the local economy. Part of the dredging work is to allow these vessels to sit in shelter at the head of the harbour, and this is critical over the winter period. The buildup of weed and the pervading smell is a serious detriment to tourism which is also a vital part of the local economy. Tourists are attracted to this working harbour situated as it is within the heart of the village and home the Port William Inshore Rescue (PIRSAC) boathouse and very successful ‘The View’ café above.

If no work was carried out the harbour would gradually silt so that no working boats could operate; this, leading to a decline of the Harbour, would directly impact on the tourist trade and seal the fate of this fishing village.

It is based on this assessment that a dredging licence application is being made.

3 Options under Consideration

3.1 Introduction

This section of the report considers the options judged to be practicable in Section 2 –

- Land-based excavators.

3.2 Land Based Excavators

3.2.1 Overview

Use of two land-based excavators supported by tractor/trailer combinations operating on the dry harbour bed around low water to move excess material away from the quay wall, improving depths by up to 1 metre.

Historically any material removed from the harbour has been disposed of outwith the harbour for natural dispersal.

3.2.2 Environmental Considerations

Disposal outside of the harbour has been the historic disposal method at Port William and is in harmony with the natural environment.

3.2.2.1 Pollution/contamination implications

All sample results were found to be below the action level AL1 concentration, apart from some small exceedances for copper, zinc, cadmium and nickel. Public Health and safety implications

Use of the two excavators presents medium risks to the public when they are delivered by low loader. The same level of risk applies whilst manoeuvring to enter the harbour down the slipway at the Northern corner, but this can be supervised by a banksman. Given the normal operating times early morning or evening pedestrian footfall is very low. Apart from engine noise and exhaust emissions from the two excavators there is minimal risk to the public whilst the clearance work is being undertaken as the area is only accessible by the public by the slipway.

The work itself is medium risk for the drivers, the work has been risked assessed by the Harbour Authority and will be risk assessed by the contractor. This operating window will be closely controlled and monitored by the on-duty Harbour Master allowing ample time to effect rescue of a stranded driver or excavator by either the second excavator or water borne craft e.g. PIRSAC. It is safe to walk ashore from the harbour bed except for the soft seaweed are at the head of the harbour. Rescue ladders are positioned at very regular intervals along the quay and all reach to the bed of the harbour.

The operation would result in a microscopic increase in NO_2 and airborne particle matter (from exhaust), this would be negligible when compared to the background pollution already present from traffic operating in the centre of Port William.

The work will require up to 4 tidal windows of 4-5 hours each (depending on weather conditions and especially wind direction) to conduct the dredging work. There will be some minimal noise disturbance to adjacent properties.

There would be no impact on the local road network except for the delivery and uplift of the equipment by low loader.

3.2.2.2 General ecological implications

The spoil is being disposed of in its natural environment and by natural means, it is not anticipated that there will be any significant impacts on ecology (flora and fauna).

There are SSSI sites on the Solway, the nearest of which is several nautical miles south of Port William in Monreith Bay (#9326). However, it is not anticipated any of the dredged material would reach these locations given the prevailing wind and longshore drift both push dredged material north.

This is a preferable option given the immediate proximity of the disposal location and is a tried and accepted method from historical dredging operations at Port William harbour. Leaving the castings on the foreshore is not ideal, but its' dispersal is immediately assisted by the strong tides and the wind/wave action in this location which is fully exposed on the eastern side of Luce Bay and open to any weather coming in from the Irish Sea.

3.2.2.3 Interference with existing activities

The work does impact on the small fishing fleet as there will be restricted berthing over Low Water whilst work is carried out. Suitable notice will be given to both home vessels and visitors by way of Notice to Mariners. Vessels will be able to land catch as normal over the High Water tidal window. There would be engine and machinery noise interference to the harbour users, immediate neighbouring properties and public using the adjacent footpaths and roads.

3.2.2.4 Amenity / Aesthetic Implications

This method would be a preferable option as it would remove the spoil from the area in a controlled and targeted manner. It would also provide the best result for Harbour users.

3.2.2.5 Environmental summary

Levels of contaminants within the dredged material are below that which would result in ecological impacts and are no different from those associated with the natural environment of the harbour and adjacent Luce Bay. This option is viewed as the lowest impact environmentally.

3.2.3 Strategic considerations

3.2.3.1 Availability of suitable sites

Disposal is immediately available directly outwith the harbour within the Statutory Harbour Authority Area.

3.2.3.2 Public Acceptability

The movements of the dredging would cause noise during the operating windows. The nearest neighbouring property to the dredging area is 20 metres away. The immediate locality around the harbour is a residential area of the village. However, given the benefits of the removal of the foul smelling seaweed, it is predicted that this inconvenience will be acceptable for the short periods proposed.

Hours of working are determined by tidal factors. Due to the need to operate on large Spring Tides clearance work is forecast as between 0500 and 1100, and 1700 to 2300 hours. There may be some impact on residential properties and to the public who have access to the harbour quay and adjacent roads.

There would be no impact on public roads except for delivery and uplift of the 2 machines.

Historically this has been the preferred disposal method for dredging.

3.2.3.3 Legislative implications

The spoil will be a controlled waste material. The works will require a licence from Marine Scotland and there is no requirement for consent from the Crown Estate as the Statutory Harbour Authority Area is owned by Dumfries and Galloway Council.

3.2.3.4 Strategic summary

This method is likely to result in some disruption to the public but be perceived positively as it will remove the source of the ‘Port William pong’. The amount of dredge material from this project is relatively small and does not support use of disposal options more suitable to larger scale projects. Alternative disposal methods are restricted by the operating constraints of this small drying harbour and the vessels available. There are also significantly greater costs associated with these other options as set out in section 3.3 Cost Analysis.

This option using land-based excavators is viewed as the most appropriate method.

3.3 Cost Analysis

Below is a table showing the comparative costs of the viable options being considered:

Method	Land-based Excavators	Grab Dredging Wyre Marine Admiral Day	Grab Dredging Wyre Marine Admiral Day
Mobilisation & Demobilisation	Not req'd.	Ex Fleetwood	£8000
Fuel	Included	Included	Included
Vessel Hire	Not req'd.	£4800 per day	12 days hire £57600
Pump Hire	Not req'd.	Not req'd.	Not req'd.
Fuel for Pump	Not req'd.	Not req'd.	Not req'd.
Engineer and survey equipment hire	Not req'd.	Not req'd.	Not req'd.
Safety/discharge hose control boat with 2 crew	Not req'd.	Not req'd.	Not req'd.
Crane hire	Not req'd.	Not req'd.	Not req'd.

Fixed price per dredge for mobilisation and hire of 2 x excavators with drivers.	**£5000**	**Not req'd.**	**Not req'd.**
Total Costs	**£5000**		**£57600**

4 Conclusions – Best Practicable Environmental Option.

4.1 Summary of available options

Due to the high public safety and environmental impacts any options removing the waste materials by road were discounted. Three disposal options by way of 6 methods were then considered for the disposal of the dredged material from the main basin at Port William harbour. Of these only Land based excavators using natural dispersal was deemed a viable option.

The 'do nothing' approach does not solve the immediate operational issues and does not support the future use of this very busy fishing harbour.

The preferred option is reviewed in summary form in the table below.

Scoring: 1 (least acceptable) to 5 (most acceptable).

Aspect (Acceptability rating)		**Land-Based Excavators with natural dispersal**
Environmental Acceptability		
Pollution contamination		5
Public health and safety		5
General ecological implications		5
Interference-existing activities		4
Amenity/aesthetic		5
Strategic Acceptability		

Availability of suitable sites		5
Public acceptability		5
Legislative implications		4
Cost		5
SCORED RATING		43

4.2 Rankings

Land-Based Excavators with natural dispersal

- The method is likely to be the most environmentally acceptable option with a very low risk of significant impacts.
- This method is unlikely to result in disruption or nuisance or safety risks to members of the public.
- As a tried and tested methodology is unlikely to cause any public concern.
- This method would allow a targeted approach with the best end result.
- Dredged material would be disposed of by natural means and not come into direct contact with anyone as part of the works.
- This option would have to lowest financial impact on the harbour and ultimately its users.
- This option facilitates the dredging work being undertaken in the shortest window and minimises disruption to normal use of the harbour by a busy fishing fleet.

5 BEST PRACTICABLE AND ENVIRONMENTAL OPTION

Based on the discussion provided above, we consider that **Land-Based Excavators with natural dispersal** represents the most viable option in terms of minimal ecological, environmental, cost and strategic considerations and that such a disposal operation is considered an acceptable option under the terms of the Marine (Scotland) Act 2010.