Best Practicable Environmental Option Assessment

Montrose Port Authority Maintenance Dredging

July 2022

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Contents

Appendices

Document history

Version	Date	Notes
P2018-18-BPEO-R1	27 July 2021	Draft issued for review
P2018-18-BPEO-R2	4 August 2021	Final issue
P2018-18-BPEO-R3	12 October 2021	Updated following discussions with Angus Council
P2018-18-BPEO-R4	11 July 2022	Updated for 2022 marine licence application

1. Introduction

Montrose Port is a leading support, logistics and service hub for the North Sea energy industry and the general cargo market.

As a statutory harbour authority of a Trust Port, Montrose Port Authority (MPA) undertakes regular maintenance dredging of the navigation channels and berths (shown on Figure 1) to maintain safe navigable depths and support customers' business needs. MPA has powers to dredge under the Montrose Harbour Acts and Orders 1837 to 2003, subject to consent from Scottish Ministers. For over 30 years, dredged material has been deposited at the sea disposal site Montrose FO 010 (Lunan Bay) as authorised by a marine licence from Marine Scotland – Licensing Operations Team (MS-LOT).

This report presents the Best Practicable Environmental Option (BPEO) assessment for material arising from maintenance dredging activity within MPA's port limits. BPEO assessment is a method for identifying the option that provides the *most environmental benefit* or *least environmental damage*. It assesses the performance of different options using a range of criteria such as environmental impact, technical feasibility and cost.

This updated BPEO will support an application to MS-LOT for a one-year sea licence under the Marine (Scotland) Act 2010, Part 4, Marine licensing to deposit dredged material at the Montrose Bay trial site, or the Montrose FO 010 (Lunan Bay) site, once the existing marine licence expires 23 September 2022.

2. Description of dredging activity and dredged material

2.1. Dredging activity

Maintenance dredging is carried out to remove fluvial silt and fine sand from the inner harbour, and sand from the navigation channel which is typically transported into the harbour during easterly storms. Dredging occurs for approximately 15 days per year, split between up to three campaigns per annum. Dredging is responsive depending on the rate of accretion, as measured by regular bathymetric surveys. During a severe easterly storm, navigational depth can be lost very quickly: for example, in 2014 2.2 m of depth was lost in 4 days.

Dredging is typically undertaken using a trailer suction hopper dredger (TSHD) with a hopper capacity of approximately 2,500 m^3. Each dredging campaign usually takes place over 4 to 7 days of neap tides when current speeds are lower: the South Esk is one of the fastest flowing rivers in the UK, making it challenging to dredge effectively or safely during flood tides.

Since 2010 the average annual maintenance dredging volume has been approximately 60,000 m^3, varying from no dredging in 2013 to approximately 108,000 m^3 in 2016.

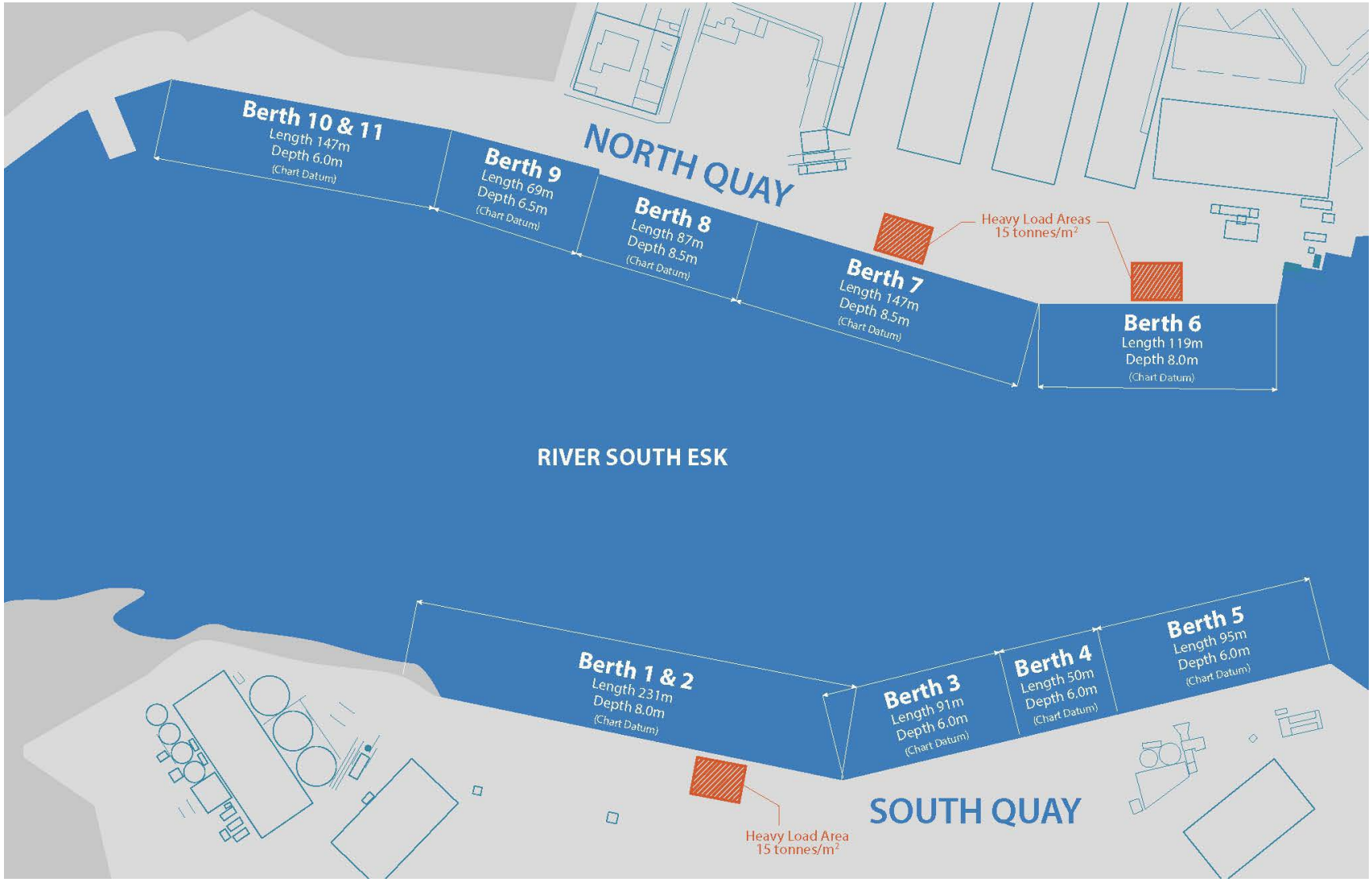

Figure 1 Map of Montrose Port

2.2. Material to be dredged

2.2.1. Physical characteristics

Sediment sampling has been undertaken periodically for many years to support marine licence applications to deposit dredged material at sea. Analysis of sediment samples collected between 2012 and 2021 reveals that in the navigation channel the dredged material is predominantly sand (up to 99%) whereas within the inner harbour the material is more mixed, comprising approximately 38% silt/clay, 54% sand and 8% gravel.

2.2.2. Chemical characteristics

The chemical analysis results of sediment samples collected between 2012 and 2021 have been compared to the Marine Scotland Revised Action Levels, which are used to determine the contaminant loading of the material and its suitability for deposition at sea. The results from samples taken in 2012, 2013 and 2014 are briefly summarised below, and the results from samples taken in 2018 and 2021 are considered in greater detail as they are considered more representative of the material to be dredged.

2012, 2013 and 2014 samples

Sediment samples from 2012 revealed no contaminant concentrations greater than Revised Action Level 1 for heavy metals, tributyltin (TBT), polychlorinated biphenyls (PCBs) or polycyclic aromatic hydrocarbons (PAHs). In 2013, a small amount of TBT was recorded within a berth sample along with the PAH Anthracene, but these only marginally exceeded Revised Action Level 1. The samples from 2014 indicated a small elevation in concentrations of PAHs and heavy metals (mainly lead and zinc), but again only marginally exceeding Revised Action Level 1, with no other contaminant elevations of concern.

2018 samples

Ten sediment samples collected in January 2018 revealed no elevations above Revised Action Level 1 for TBT, PAHs and PCBs. Some heavy metals marginally exceeded Revised Action Level 1 at Berth 1 (chromium (61.5 µg/kg); copper (47.3 µg/kg); and nickel (57.8 µg/kg) but the results were well below Revised Action Level 2.

2021 samples

Four sediment samples collected in March 2021 revealed no elevations above Revised Action Level 1 for heavy metals, organotins, PAHs or PCBs. The full results are provided in Appendix A.

3. Scoping of potential options

This section describes potential options for the dredged material. Where an option is not considered feasible, the reason is given and it is not taken forward to the assessment stage. Options that are considered practicable are considered in Section 4.

3.1. Option 1: Landfill

The most common use of dredged material within landfill sites is as capping or restoration material. Material would need to be brought ashore within the port estate and dewatered before being transported to trucks and taken by road to a landfill site. Suitable land for drying lagoons is not available within the port estate.

There are no suitable sites in the immediate vicinity of Montrose Port that could cope with a large volume of material on an annual basis. The closest operational landfill site to the port is the Prettycur Landfill, approximately 7.5 km to the north by road (Scottish Environment Protection Agency (SEPA), 2021).

Existing landfill sites must cope with large volumes of domestic and industrial waste, and marine dredgings on the present scale would place an intolerable burden on such sites. Dredged material is relatively inert by landfill standards, so disposal at a landfill site is not usually necessary or recommended unless it is contaminated, which it is not in this case (see Section 2.2.2).

Transportation of material from the harbour to a landfill site would generate significant vehicle movements on local roads, contributing to traffic congestion and air and noise pollution.

This option has been discounted.

3.2. Option 2: Deposition at sea

The dredged material meets the chemical requirements for deposition at sea (see Section 2.2.2).

Deposit sites in the marine environment are designated by MS-LOT. The closest licensed sea deposit site to Montrose Port is Montrose FO 010 (Lunan Bay). Dredged material from Montrose Port has been deposited at this site using a split hopper barge for over 30 years. A new deposit site within Montrose Bay has been proposed by MPA and trial deposits are taking place at the site.

This option is considered feasible and is explored in more detail in Section 4.

3.3. Option 3: Agriculture use

The north-east of Scotland is a rural farming area with an abundance of good arable land and there is no known requirement for a supply of imported material. The dredged material would have to be de-watered and desalinated to make it suitable for soil conditioning or spreading, and no land is available within the port estate to locate a drying lagoon.

This option has been discounted.

3.4. Option 4: Use in land reclamation

Dredged material can be suitable for land reclamation. The material grade and quality are critical: material suitable for reclamation is generally medium to coarse sands and gravel fractions, typically in large volumes. The dredged material within the navigation channel may be suitable for land reclamation due to its high sand content (see Section 2.2.1) but the material in the inner harbour has a higher clay/silt content and so is unlikely to be suitable.

No land reclamation projects have been identified within the Port of Montrose or the local vicinity which require dredged material for land reclamation purposes. This option is therefore discounted for the 2023 marine licence; however, the sand and gravels dredged from the navigation channel may be suitable for future land reclamation projects should there be a local need that aligns with the timescale required for maintenance dredging.

3.5. Option 5: Use as construction material

The saline content of the dredged material makes it unsuitable as a construction material. The grading and washing required coupled with the drying and storage challenges previously identified makes this option uneconomical and unpractical.

This option has been discounted.

3.6. Option 6: Beach recharge

The use of dredged material for beach recharge is a sustainable beneficial use: it generates a purpose for the material that benefits a local amenity. Material is typically deposited direct from the dredging vessel via a pipeline or by ‘rainbowing’ onto the beach, where it is reprofiled using land-based plant.

This option is considered feasible and is explored in more detail in Section 4.

3.7. Summary of options scoping

The scoping of potential options concludes that options 1 (landfill), 3 (agricultural use), 4 (use in land reclamation) and 5 (use as construction material) are not viable for the reasons described above. The following options will be taken forward to assessment:

- Deposition at sea
- Beach recharge

4. Assessment of options

In this section, deposition at sea and beach recharge are assessed for strategic, environmental and financial considerations.

4.1. Assessment methodology

MS-LOT's general licensing guidance (MS-LOT, 2015) states the following in relation to BPEO assessment: *'consideration must be given to the availability of practical alternatives when considering any applications involving disposal of material at sea. In order for MS-LOT to assess the available alternative options, all sea disposal licence applications must be supported by a detailed assessment of the alternative options. This should include a statement setting out the reasons, including financial, that have led to the conclusion that deposit of the materials at sea is the BPEO*.'

There is no formal guidance available in Scotland on BPEO assessment for disposal of dredged material. This BPEO adopts an approach that considers three aspects: strategic, environmental and financial. The strategic and environmental considerations for each option are described in Sections 4.2 and 4.3, and an evaluation of the relative operating costs of each option is provided in Section 4.4. Section 5 then summarises the option assessment and concludes the BPEO.

4.2. Deposition at sea

4.2.1. Strategic considerations

Operational considerations

The operational practicalities of depositing dredged material at a licensed sea deposit site are straightforward: a split hopper barge would discharge material directly at the deposit site. No preparation of the material is required prior to deposition.

Availability of suitable sites

The closest licensed sea deposit site to Montrose Port is Montrose FO 010 (Lunan Bay). Dredged material from Montrose Port has been deposited at this site for over 30 years.

MS-LOT have previously stated their position that continued deposition at Lunan Bay is not the BPEO for maintenance dredged material from Montrose Port as they consider there could be other practicable uses such as nourishment of Montrose Bay/Beach. As a result, MPA is working in collaboration with MS-LOT, NatureScot and Angus Council to characterise a new deposit site within Montrose Bay. The aspiration is that deposition at a new site within the bay would retain material in the nearshore area so that it may contribute to protecting the beach and dune system, although the processes influencing coastal erosion are wide-ranging and complex, and it is not universally accepted that maintenance dredging within Montrose Port is a significant contributing factor (ABPmer, 2019a).

Following trial deposits at the proposed site in 2022, significant accretion was observed in the Montrose Port navigation channel which required an additional dredging campaign in May 2022. As it is unusual for the channel to accrete so quickly after maintenance dredging when there have not been significant northerly/easterly storms, MPA has agreed with MS-LOT that

the characterisation study will be paused for one year to allow continued monitoring of the proposed deposit site and navigation channel. In the meantime, trial deposits will continue at the Montrose Bay site, subject to agreement with MS-LOT.

If/when the characterisation study concludes that the proposed Montrose Bay site is acceptable, and the site is designated as open by MS-LOT, the BPEO will be updated to reflect this additional option for the dredged material. At the present time, Lunan Bay remains the only licensed sea deposit site within a reasonable sailing distance of Montrose Port, with trial deposits continuing at the proposed Montrose Bay site.

The remainder of this assessment focuses on the Lunan Bay site as it is currently the only suitable licensed site. Further assessment of the proposed Montrose Bay site will form part of the site characterisation study.

Legislative implications

MPA has powers to dredge under the Montrose Harbour Acts and Orders 1837 to 2003, provided that the activity is approved by the Scottish Ministers. A marine licence is required from MS-LOT to deposit material at sea.

Section 34 of the Environmental Protection Act 1990 (as amended) makes it a duty to take all measures available as are reasonable in the circumstances to apply the waste hierarchy set out in Article 4(1) of the Waste Directive. The waste hierarchy ranks waste management options according to the best environmental outcome taking into consideration the lifecycle of the material. In its simplest form, the waste hierarchy gives top priority to preventing waste. When waste is created, it gives priority to reuse, then recycling, then other recovery, and last of all disposal. The option to deposit the dredged material at sea ranks poorly on the waste hierarchy as it is classed as disposal.

4.2.2. Environmental considerations

Safety implications

Deposition at sea has negligible implications for safety providing that standard navigation and maritime safety procedures are observed.

Public health implications

There are no threats to public health associated with deposition of uncontaminated dredged material at sea.

Pollution/contamination implications

As described in Section 2.2.2, the material to be dredged is suitable for deposition at sea according to the Marine Scotland Revised Action Levels, so the risk of pollution/contamination of the marine environment is very low.

Interference with other legitimate interests

The Lunan Bay deposit site is located in open water outwith shipping channels. There is the potential for interference between the dredging vessel and other users of the sea (e.g. fishing or recreational vessels), which can be managed through compliance with harbour byelaws and standard communications between the dredging crew, MPA and other users. The risk of interference with other legitimate interests is low.

Amenity/aesthetic implications

There are no amenity or aesthetic implications of depositing material at a designated offshore site.

Ecological Implications

Deposition at sea can smother marine life on the seabed within the site. As the Lunan Bay site has been in use for many years and is subject to regular deposition of material, it is likely that any benthic species in and around the site can tolerate the periodic disturbance caused by deposition and temporary increases in turbidity.

A dedicated Marine Mammal Observer (MMO) watch would be kept by a nominated crew member on the dredging vessel, following the general guidance for and acting in the role of MMO, to ensure that there were no marine mammals within 500 m prior to deposit operations. If marine mammals were observed, deposit operations would be stopped until the area had been clear for at least 20 minutes.

4.3. Beach recharge

4.3.1. Strategic considerations

Operational considerations

Beach recharge/nourishment would require either a pipeline connected to the dredger to pump material ashore onto the beach, or a dredger capable of accessing the nearshore area to discharge the material directly using a 'rainbowing' technique.

For the pipeline method, the loaded dredger would moor at a suitable point offshore and a floating pipeline would pump material onto the beach, where it would then be reprofiled using land-based mechanical plant.

For the rainbowing method, the dredging vessel must have sufficiently shallow draft to access the shallow nearshore area. This could not be achieved using the current dredging equipment (see Section 2.1); a smaller dredger would be required.

Both the pipeline and rainbowing methods take significantly longer to discharge than the open water bottom-dumping method. Due to the tidal restrictions on the dredging operation (as described in Section 2.1), for a typical dredging campaign it would not be possible to complete the dredging and beach discharge operation over a single neap tidal cycle. As such, dredging would need to be split over two neap tidal cycles, which would require the dredger to demobilise and return to Montrose Port on a future neap tidal cycle. Operationally, this is considerably less efficient than the existing dredging regime. As dredging equipment is usually in high demand in Scotland, it may be challenging to secure the return of a dredging vessel two weeks after its departure.

Maintenance dredging at Montrose Port is typically reactive: bathymetric surveys identify when navigable depths are reduced, which triggers a dredging campaign. If the dredging is split over two neap tidal cycles as described above, navigable depths may be compromised in the intervening period, which may restrict MPA's operations and ultimately cause a hazard to navigation.

As described in Section 2.2.1, the material dredged from the navigation channel is predominantly sand, which is suitable for beach recharge. Material dredged from the inner harbour is less likely to be suitable for beach recharge due to the higher silt/clay content (average 38%).

Availability of suitable sites

Montrose Beach, which is immediately north of Montrose Port, is considered to be a suitable reception site for a beach recharge operation. Coastal erosion, beach and sand dune recession has occurred throughout Montrose Bay in common with much of Eastern Scotland. Shoreline change analysis back to 1903 has identified morphological variability across Montrose Bay through time, with both phases of erosion and accretion (ABPmer, 2019a). The overall trend across the Bay is erosion. Erosion (represented by recession of the dune front) has dominated during the last 30 years in the area of the Montrose Golf Links.

Discussions between MPA and Angus Council in October 2021 and July 2022 (see Appendix B for details) have confirmed that Angus Council are unlikely to be in a position to make use of maintenance dredged material for recharging the Montrose beach/dune system within the timeframe of the proposed marine licence (i.e. Q3-4 2022 – Q3-4 2023). MPA will maintain a regular dialogue with Angus Council regarding its future dredging plans, to enable Angus Council to identify any opportunities to make use of suitable dredged material.

No suitable beach recharge schemes/sites have been identified within the timeframe of the proposed marine licence.

Legislative implications

Standing advice from SEPA states that waste material, which includes dredged material, deposited above the low water mark is subject to Waste Management Licensing controls regulated by SEPA unless it is subject to a licence issued under Part 4 of the Marine (Scotland) Act 2010, in which case it is excluded from such controls (SEPA, 2016), provided that it does not constitute a landfill. As beach recharge would require a marine licence, it is assumed that a separate Waste Management Licence would not be required.

The option to reuse the dredged material for beach recharge ranks favourably on the waste hierarchy; it negates the need to otherwise dispose of the material.

Dredged material to be used for beach recharge requires a licence from the Crown Estate Scotland, and a royalty is payable for use of the material.

4.3.2. Environmental considerations

Safety implications

The use of a floating pipeline presents a potential hazard to navigation which would require marking and lighting in accordance with standard industry practices.

Pumping or rainbowing material onto the beach and subsequent reprofiling may present a hazard to beach users. It would be necessary to cordon off areas of the beach during the recharge operation.

Public health implications

As described in Section 2.2.2, the material to be dredged is suitable for deposition at sea according to the Marine Scotland Revised Action Levels, so the use of the material on the beach is highly unlikely to present issues for public health.

Pollution/contamination implications

As described in Section 2.2.2, the material to be dredged is suitable for deposition at sea according to the Marine Scotland Revised Action Levels, so the risk of pollution/contamination of the beach environment is very low.

Interference with other legitimate interests

As described above, a the beach recharge operation it would be necessary to restrict access to areas of Montrose Beach and the inshore waters around the dredger. This is unlikely to be a significant concern due to the short-term nature of the operation and the wider perceived benefit to the local community of recharging an eroding beach.

Amenity/aesthetic implications

The beach provides a valuable local amenity. As described above, it would be necessary to cordon off areas of the beach during the recharge operation. This is unlikely to be a significant concern due to the short-term nature of the operation and the wider perceived benefit to beach users of recharging an eroding beach.

Ecological Implications

There are no significant ecological issues associated with using dredged material for beach recharge. It is preferable for the source material to match the existing beach material, so material from the inner harbour is less likely to be suitable due to the higher silt/clay content (average 38%).

4.4. Operational cost evaluation

Table 1 is reproduced from the 2019 BPEO Assessment (ABPmer, 2019b), and provides an estimate of the relative operating costs of deposition at sea and beach recharge. For beach recharge, two sub-options are presented: material pumped ashore by pipeline attached to the dredging vessel; and material 'rainbowed' ashore from the dredging vessel.

Dredging costs can vary considerably year-to-year depending on dredger availability, fuel prices and other factors, so Table 1 presents a range of estimated operating costs based on ABPmer's knowledge of the UK dredging industry.

The comparison in Table 1 does not capture the increased mobilisation/demobilisation costs if the dredger were required to carry out the dredging campaign over two separate neap tidal cycles during beach recharge, as described in Section 4.3.1. It excludes the Crown Estate royalties payable by the end user (likely to be Angus Council) for use of dredged material for beach recharge. For deposition at sea, it excludes the capital costs of characterising a new sea deposition site within Montrose Bay (see Section 4.2.1).

Table 1 Comparison of dredging operating costs

Activity	Cost per m^3		
	Deposition at sea	Beach recharge	
		Material pumped ashore	Material rainbowed ashore
Dredging	£2 - £4	£2.50 - £5	£3 - £6
Pumping ashore	n/a	£5 - £8	£12 - £14
Mooring and floating pipe infrastructure: deployment and removal	n/a	£5 - £10	n/a
Beach profiling	n/a	£2	£2
TOTAL	***£2 - £4***	***£14.50 - £25***	***£17 - £22***

5. Best practicable environmental option

Two potential options are considered in the assessment: deposition at sea and beach recharge.

Operationally, both options are technically practicable but deposition at sea is the preferred option as it allows the dredging to be completed within a single neap tidal cycle, maintains the maximum flexibility in terms of dredging equipment that can be used, and utilises an existing licensed sea deposit site (Montrose FO 010, Lunan Bay). Recent discussions with Angus Council have confirmed that they are unlikely to be in a position to make use of maintenance dredged material for recharging the Montrose beach/dune system within the timeframe of the proposed marine licence (see Appendix B).

Environmentally, beach recharge is the preferred option according to the waste hierarchy as it uses a material that would otherwise be disposed. Neither option would be likely to cause significant safety, public health, amenity or pollution/contamination issues.

Financially, the costs are in the region of 6-7 times greater for beach recharge than for deposition at sea.

Considering all three aspects, sea deposition of material at Montrose FO 010 (Lunan Bay) is the BPEO.

As described in Section 4.2.1, MPA is working with MS-LOT, NatureScot and Angus Council to characterise a new deposit site within Montrose Bay. If/when the new deposit site is designated as open by MS-LOT, the BPEO will be updated to reflect this additional option for the dredged material. In the meantime, trial deposits will continue at the proposed Montrose Bay site, subject to agreement with MS-LOT.

6. References

ABPmer (2019a). Coastal Process Assessment – Montrose and Surrounding Coastline - 2019. ABPmer Report R2848a.

ABPmer (2019b). Maintenance Dredging Best Practicable Environmental Option Assessment. ABPmer Report R2919a.

MS-LOT (2015). Marine Scotland Guidance for Marine Licence Applicants: Version 2 - June 2015. https://www.gov.scot/publications/marine-licensing-applications-and-guidance/ [accessed 20 July 2021].

SEPA (2021) https://www.sepa.org.uk/data-visualisation/waste-sites-and-capacity-tool/ [accessed 20 July 2021].

SEPA (2016) Land Use Planning System SEPA Guidance Note 13: SEPA standing advice for The Department of Energy and Climate Change and Marine Scotland on marine consultations. Issue No. 5. Issued 29/09/2016.

Appendix A
2021 sediment sampling results

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	**MAR00975**
Issue Version	2
Customer	Montrose Port Authority, South Quay, Ferryden, Montrose, Angus, DD10 9SL
Customer Reference	Marine Scotland Analysis
Date Sampled	24-Mar-21
Date Received	15-Apr-21
Date Reported	20-May-21
Condition of samples	Cold Satisfactory

This is a revised report and contains the repeated value for Nickel on sample EC21-GB03. This report replaces all previously issued versions.

[redacted]

Authorised by: Marya Hubbard

Position: Laboratory Manager

Any additional opinions or interpretations found in this report, are outside the scope of UKAS accreditation.

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Test Report ID	MAR00975
Issue Version	2
Customer Reference	Marine Scotland Analysis

		Units	%	%	%	%	%	Mg/m3
		Method No	ASC/SOP/303	ASC/SOP/303	SUB_01*	SUB_01*	SUB_01*	SOCOTEC Doncaster*
		Limit of Detection	0.2	0.2	N/A	N/A	N/A	N/A
		Accreditation	UKAS	UKAS	N	N	N	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Total Moisture @ 120°C**	**Total Solids**	**Gravel (>2mm)**	**Sand (63-2000 µm)**	**Silt (<63 µm)**	**Particle Density**
EC21-GB01	MAR00975.001	Sediment	9 94	90.1	0.2	96.5	3.3	2.57
EC21-GB02	MAR00975.002	Sediment	24.9	75.1	0.9	99.1	0.0	2.53
EC21-GB03	MAR00975.003	Sediment	10.2	89.8	15.5	83.4	1.1	2.53
EC21-GB06	MAR00975.004	Sediment	14.6	85.4	0.5	96.8	2.7	2.55
EC21-GB07	MAR00975.005	Sediment	–	–	61.6	1.1	37.3	–
EC21-GB08	MAR00975.006	Sediment	–	–	64.9	1.8	33.3	–
		Reference Material (% Recovery)	N/A	N/A	N/A	N/A	N/A	N/A
		QC Blank	N/A	N/A	N/A	N/A	N/A	N/A

* See Report Notes

NAIIS - No Asbestos Identified In Sample

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Test Report ID	MAR00975
Issue Version	2
Customer Reference	Marine Scotland Analysis

		Units	N/A	% M/M
		Method No	SUB_02*	SOCOTEC Env Chem*
		Limit of Detection	N/A	0.02
		Accreditation	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Asbestos**	**TOC**
EC21-GB01	MAR00975.001	Sediment	NAIIS	0.11
EC21-GB02	MAR00975.002	Sediment	NAIIS	0.05
EC21-GB03	MAR00975.003	Sediment	NAIIS	1.16
EC21-GB06	MAR00975.004	Sediment	NAIIS	0.09
EC21-GB07	MAR00975.005	Sediment	–	–
EC21-GB08	MAR00975.006	Sediment	–	–
		Reference Material (% Recovery)	N/A	96
		QC Blank	N/A	<0.02

* See Report Notes

NAIIS - No Asbestos Identified In Sample

Certificate of Analysis

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Test Report ID	MAR00975
Issue Version	2
Customer Reference	Marine Scotland Analysis

		Units	mg/Kg (Dry Weight)							
		Method No	SOCOTEC Env Chem*							
		Limit of Detection	0.5	0.04	0.5	0.5	0.01	0.5	0.5	2
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Arsenic**	**Cadmium**	**Chromium**	**Copper**	**Mercury**	**Nickel**	**Lead**	**Zinc**
EC21-GB01	MAR00975.001	Sediment	7.7	0.10	17.0	12.5	0.04	15.3	8.9	31.0
EC21-GB02	MAR00975.002	Sediment	7.2	0.05	15.7	13.3	0.02	12.8	6.9	24.8
EC21-GB03	MAR00975.003	Sediment	8.8	0.10	17.0	20.0	0.08	11.2	7.3	29.2
EC21-GB06	MAR00975.004	Sediment	6.9	0.08	19.7	12.5	0.03	15.4	7.6	36.7
Certified Reference Material SETOC 774 (% Recovery)			100	99	100	104	98	101	98	99
QC Blank			<0.5	<0.04	<0.5	<0.5	<0.01	<0.5	<0.5	<2

* See Report Notes

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Test Report ID	MAR00975
Issue Version	2
Customer Reference	Marine Scotland Analysis

		Units	µg/Kg (Dry Weight)	
		Method No	ASC/SOP/301	
		Limit of Detection	1	1
		Accreditation	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Dibutyltin (DBT)**	**Tributyltin (TBT)**
EC21-GB01	MAR00975.001	Sediment	<1	<1
EC21-GB02	MAR00975.002	Sediment	<1	<1
EC21-GB03	MAR00975.003	Sediment	<1	<1
EC21-GB06	MAR00975.004	Sediment	<1	<1
In House Reference Material (% Recovery)~			112	134
QC Blank			<1	<1

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

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Test Report ID MAR00975
Issue Version 2
Customer Reference Marine Scotland Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	N*	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**ACENAPTH**	**ACENAPHY**	**ANTHRACN**	**BAA**	**BAP**	**BBF**
EC21-GB01	MAR00975.001	Sediment	<1	1.01	<1	<1	<1	<1
EC21-GB02	MAR00975.002	Sediment	<1	<1	<1	<1	<1	<1
EC21-GB03	MAR00975.003	Sediment	<1	<1	<1	<1	<1	<1
EC21-GB06	MAR00975.004	Sediment	<1	<1	<1	<1	<1	<1
Certified Reference Material Quasimeme QPH100MS (% Recovery)			134	124	110	104	94	96
QC Blank			<1	<1	<1	<1	<1	<1

For full analyte name see method summaries
~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.
As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.
* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID MAR00975
Issue Version 2
Customer Reference Marine Scotland Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**BENZGHIP**	**BKF**	**CHRYSENE**	**DBENZAH**	**FLUORANT**	**FLUORENE**
EC21-GB01	MAR00975.001	Sediment	<1	<1	<1	<1	<1	<1
EC21-GB02	MAR00975.002	Sediment	<1	<1	<1	<1	<1	<1
EC21-GB03	MAR00975.003	Sediment	<1	<1	<1	<1	<1	<1
EC21-GB06	MAR00975.004	Sediment	1	<1	<1	<1	<1	<1
Certified Reference Material Quasimeme QPH100MS (% Recovery)			96	87	105	101	99	111
QC Blank			<1	<1	<1	<1	<1	<1

For full analyte name see method summaries
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As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.
* See Report Notes

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Test Report ID MAR00975
Issue Version 2
Customer Reference Marine Scotland Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/306
		Limit of Detection	1	1	1	1	100
		Accreditation	UKAS	UKAS	N	UKAS	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**INDPYR**	**NAPTH**	**PHENANT***	**PYRENE**	**THC**
EC21-GB01	MAR00975.001	Sediment	<1	<1	<1	<1	531
EC21-GB02	MAR00975.002	Sediment	<1	<1	<1	<1	457
EC21-GB03	MAR00975.003	Sediment	<1	<1	<1	<1	2060
EC21-GB06	MAR00975.004	Sediment	1.1	<1	<1	<1	1460
Certified Reference Material Quasimeme QPH100MS (% Recovery)			101	92	120	102	97~
QC Blank			<1	<1	<1	<1	<100

For full analyte name see method summaries
~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.
As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.
* See Report Notes

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Test Report ID	MAR00975
Issue Version	2
Customer Reference	Marine Scotland Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.08	0.08	0.08	0.08	0.08	0.08	0.08
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB138**	**PCB153**	**PCB180**
EC21-GB01	MAR00975.001	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
EC21-GB02	MAR00975.002	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
EC21-GB03	MAR00975.003	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
EC21-GB06	MAR00975.004	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Certified Reference Material Quasimeme QOR142MS (% Recovery)			66	93	73	92	103	100	91
QC Blank			<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

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Test Report ID MAR00975
Issue Version 2
Customer Reference Marine Scotland Analysis

REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
SOCOTEC Env Chem*	MAR00975.001-004	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
SOCOTEC Doncaster*	MAR00975.001-004	Analysis was conducted by an internal SOCOTEC laboratory.
SUB_01*	MAR00975.001-006	Analysis was conducted by an approved subcontracted laboratory.
SUB_02*	MAR00975.001-004	Analysis was conducted by an approved subcontracted laboratory.
ASC/SOP/301	MAR00975.001-004	Due to the Assigned Values for the Certified Reference Material ran with this batch being below the LOD for the method , the In House reference material has been reported.
ASC/SOP/303/304	MAR00975.001-004	The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. The remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected.However in line with our QMS policy we have removed accreditation, where applicable, from the affected analytes (BAP, PHENANT) . These circumstances should be taken into consideration when utilising the data.

DEVIATING SAMPLE STATEMENT

Deviation Code	Deviation Definition	Sample ID	Deviation Details. The following information should be taken into consideration when using the data contained within this report
D1	Holding Time Exceeded	N/A	N/A
D2	Handling Time Exceeded	N/A	**N/A**
D3	Sample Contaminated through Damaged Packaging	N/A	N/A
D4	Sample Contaminated through Sampling	N/A	N/A
D5	Inappropriate Container/Packaging	N/A	N/A
D6	Damaged in Transit	N/A	N/A
D7	Insufficient Quantity of Sample	N/A	N/A
D8	Inappropriate Headspace	N/A	N/A
D9	Retained at Incorrect Temperature	N/A	N/A
D10	Lack of Date & Time of Sampling	N/A	N/A
D11	Insufficient Sample Details	N/A	N/A
D12	Sample integrity compromised or not suitable for analysis	N/A	N/A

Certificate of Analysis

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Test Report ID	MAR00975
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Method	Sample and Fraction Size	Method Summary
Total Solids	Wet Sediment	Calculation (100%-Moisture Content).Moisture content determined by drying a portion of the sample at 120°C to constant weight.
Particle Size Analysis	Wet Sediment	Wet and dry sieving followed by laser diffraction analysis.
Total Organic Carbon (TOC)	Air dried and ground	Carbonate removal and sulphurous acid/combustion at 1600°C/NDIR.
Metals	Air dried and seived to <63µm	Aqua-regia extraction followed by ICP analysis.
Organotins	Wet Sediment	Solvent extraction and derivatisation followed by GC-MS analysis.
Polyaromatic Hydrocarbons (PAH)	Wet Sediment	Solvent extraction and clean up followed by GC-MS analysis.
Total Hydrocarbon Content (THC)	Wet Sediment	Solvent extraction and clean up followed by GC-FID analysis.
Polychlorinated Biphenyls (PCBs)	Air dried and seived to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.

Analyte Definitions

Analyte Abbreviation	Full Analyte name	Analyte Abbreviation	Full Analyte name	Analyte Abbreviation	Full Analyte name
ACENAPTH	Acenaphthene	C2N	C2-naphthalenes	THC	Total Hydrocarbon Content
ACENAPHY	Acenaphthylene	C3N	C3-naphthalenes	AHCH	alpha-Hexachlorcyclohexane
ANTHRACN	Anthracene	CHRYSENE	Chrysene	BHCH	beta-Hexachlorcyclohexane
BAA	Benzo[a]anthracene	DBENZAH	Dibenzo[ah]anthracene	GHCH	gamma-Hexachlorcyclohexane
BAP	Benzo[a]pyrene	FLUORANT	Fluoranthene	DIELDRIN	Dieldrin
BBF	Benzo[b]fluoranthene	FLUORENE	Fluorene	HCB	Hexachlorobenzene
BEP	Benzo[e]pyrene	INDPYR	Indeno[1,2,3-cd]pyrene	DDD	p,p'-Dichorodiphenyldichloroethane
BENZGHIP	Benzo[ghi]perylene	NAPTH	Naphthalene	DDE	p,p'-Dichorodiphenyldicloroethylene
BKF	Benzo[k]fluoranthene	PERYLENE	Perylene	DDT	p,p'-Dichorodiphenyltrichloroethane
C1N	C1-naphthalenes	PHENANT	Phenanthrene		
C1PHEN	C1-phenanthrene	PYRENE	Pyrene		

Appendix B
Summary of Zoom meeting between MPA & Angus Council, 7 October 2021 [Update email from Angus Council 7 July 2022 confirm position]

From:	Walter Scott
To:	Katherine Holmes
Cc:	Rachel Moir; Eleanor Doyle; Dave G Smith
Subject:	RE: Summary of Montrose dredging meeting - for review
Date:	08 July 2022 10:30:08
Attachments:	Summary of MPA AC meeting 20211007.pdf

Hello, Katherine.

I apologise for the delayed response for reasons I shared in separate email.

I am content with the wording you have shared.

For future licencing, it is our intention to work with MPA and your dredging contractors, Crown Estates Scotland, and regulators, to utilise the suitable sediment from any dredging operations you undertake. This includes routine, albeit reactive, maintenance dredge as well as any planned maintenance or capital dredging.

As discussed there is a value in the dredged material for use in coastal erosion management, which we will readily seek to establish and detail with you.

As you know, at some stage I may need to seek committee or council approval via reporting. Any development of our shared agenda will enable this to be information and helpful in any decision making required.

I hope that this is sufficient commitment for now. Please let me know if you require anything further.

Best regards,

Walter.

Walter Scott | Service Leader – Roads & Transportation | Angus Council | <REDACTED> | <REDACTED> | scottw@angus.gov.uk | www.angus.gov.uk

My pronouns are he/him.
Our priority for our Roads & Transportation services is to ensure the safe, free flow of traffic and people within our burghs and public safety.

From: Katherine Holmes <k.holmes@harrisholden.com>
Sent: 28 June 2022 10:22
To: Ian A Cochrane <CochraneIA@angus.gov.uk>; Walter Scott <ScottW@angus.gov.uk>
Cc: Rachel Moir <rachel@montroseport.co.uk>
Subject: RE: Summary of Montrose dredging meeting - for review

Dear Ian and Walter,

You may recall our meeting in October last year to discuss potential beneficial uses of capital and maintenance dredged material.

As Walter will know from recent stakeholder meetings, we've recently paused further work on the characterisation of the new Montrose Bay sea deposit site due to concerns about excessive accretion in the navigation channel following the first large-scale trial of the site. We've preparing an application to Marine Scotland for a 1-year licence to continue trial deposits at the Montrose Bay site, with the existing Lunan Bay site as a back-up (i.e. the same as this year's licence), so that we can continue to monitor channel accretion.

Could you please confirm that your position regarding the use of maintenance dredged material (paragraph 2 in the attached summary) applies to the duration of the proposed new marine licence, i.e. 2023?

Many thanks,
Katherine

Katherine Holmes
Marine Environmental Consultant

<REDACTED>
k.holmes@harrisholden.com

HARRIS HOLDEN

www.harrisholden.com

Summary of Zoom meeting held on 7th October 2021

Attending

Tom Hutchison (Montrose Port Authority (MPA))
Katherine Holmes (Harris Holden – representing MPA)
Ian Cochrane (Angus Council)
Walter Scott (Angus Council)

Angus Council are developing short- and medium-term measures to strengthen the dune system at Montrose Beach, which includes placing material within the dune system. There are various options for the source material and a final decision has not yet been made.

MPA's maintenance dredging operations tend to be carried out on a reactive basis when bathymetric surveys identify shallowing in the navigation channel and berths, often with limited notice. Due to the reactive nature of the dredging and the associated operational constraints, Angus Council is unlikely to be in a position to make use of maintenance dredged material for recharging the beach/dune system within the timeframe of the current Marine Licence, which expires on 23 September 2022. MPA will, however, maintain a regular dialogue with Angus Council regarding its future maintenance dredging plans, to enable Angus Council to identify any opportunities to make use of suitable dredged material.

MPA is currently working in collaboration with Marine Scotland – Licensing Operations Team, NatureScot and Angus Council to identify a new deposit site within Montrose Bay. The aspiration is that deposition at a new site within the bay would retain material in the nearshore area so that it may contribute to protecting the beach and dune system. Angus Council fully supports this project and will continue to participate in the MPA-led stakeholder forum as the project progresses.

There is the potential for Angus Council to retrieve material deposited by MPA within a new site if it has a future need for the material. MPA keeps records of deposit locations and can share these with Angus Council as required.

MPA is planning a capital dredge to deepen the navigation channel to 7.5 m below Chart Datum. MPA intends to carry out the dredging by Q4 2022, subject to obtaining the necessary consents. Angus Council and MPA are committed to using some or all of the capital dredged material for direct dune replenishment or beach recharge, subject to obtaining necessary consents, and will meet in due course to discuss the apportionment of responsibilities and costs.

Statement agreed by Angus Council and MPA by exchange of email on 11th October 2021