MLA/2025/00157 – Falmouth Docks Development Licence

Representation from Dr Simon Gibbon of North East Marine Research Group (NEMRG)

1 Introduction

The motivation for this representation comes from my attachment to the area around Falmouth as having married into the Lizard 45 years ago I have been a long time visitor and the representations contents are based on my technical understanding from having been involved in environmental investigations of dredging in the North East of England which was been built on my professional chemical background.

I initially looked at MLA/2025/00157 to compare with capital dredges around the North East of England and to learn how / if things were done differently in other parts of the UK. Falmouth, the Fal Estuary and the Helford Estuary are internationally recognised areas of exceptional natural value and as such I was expecting an application which made every effort to protect the associated marine and land habitats, I surprised to find this was not the case.

I make no judgement on the necessity of the development purely on the dredging methods proposed to achieve the economic objectives of the development.

In this representation I make recommendations for how the development could be achieved with increased environmental protection – 1) an alternative approach to use floating structures to avoid the need for new berth pockets, 2) use of cofferdams to avoid any release on contaminants into the marine environment, 3) dredging adopting current international best practices combined with disposal to land, 4) dredging adopting current international best practices.

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2 Summary

MLA/2025/00157 would expose the marine environment to considerable risk, this representation proposes four methods which in turn offer decreasing protection from environmental risk, while allowing the development to go ahead.

1. Almost no environmental risk - floating structures - quoting from the Falmouth Port Information Guide Falmouth is “Home to one of the world’s largest natural deep-water harbours, A&P’s Falmouth facility is the largest ship-repair complex in the UK.” I was disappointed that this natural deep-water harbour was not being used to entirely avoid the need for dredging. Surely floating structures could be created within the harbour that would allow cruise ships to visit Falmouth and FLOW to be developed, but entirely remove the need for the creation of berth pockets.
2. Minimal environmental risk - The use of cofferdams and the removal of material to land while not removing all environmental risks of this development would remove the major risk of the widespread distribution of contaminated fine particles that will occur as part of even a “clean” dredging operation.
3. Considerably reduced environmental risk - Dredging best practices combined with reuse / disposal of dredged sediment to land.
4. Reactive environmental protection - Rigorously follow current dredging best practice. The application details many risks of the proposed development specifically the dredging and the disposal of dredged materials at sea, however the mitigation of the identified risks is minimal and not up to best environmental dredging practice. In order to meet best environmental dredging practices, the method of dredging needs to changed, and an extensive suite of monitoring needs to be detailed in the dredging plan. While the developers request flexibility in the sequence in which different parts of the development are carried out, the sequence is integral to minimising environmental damage and as such needs to be considered either before the licence were granted or specified that sign-off from MMO/Cefas/NE is required as a restriction to the licence.

At a minimum the licence must not be approved without a considerably more robust approach to minimising the resuspension and the redeposition of contaminated fine sediments, combined with a monitoring system which can react to any expected or unexpected environmental risks and reactively call a halt to dredging when such risks occur.

3 Floating Structures

This is the significantly less environmentally damaging approach that leverages Falmouth's natural deep water instead of fighting against the existing seabed: **developing a high-capacity floating berth system**.

Instead of dredging new pockets into the land, this innovative solution involves building a large, stable floating platform or pontoon moored securely against or near the existing wharf. This approach avoids almost all of the environmental damage associated with dredging contaminated sediment.

I assume it is not the role of the MMO to suggest an alternative approach to that requested in a marine licence, but in the case of the environment of the Fal and Helford estuaries I believe it is essential that all approaches are considered to keep environmental damage to an absolute minimum.

3.1 How a Floating Berth System Would Work

Think of it not as digging a deeper hole for the ships, but as bringing a perfectly-sized, stable platform out to meet them in the deep water that's already there.

- **Floating Pontoon/Berth:** A very large, heavy, and extremely stable concrete or steel pontoon would be constructed. This structure would be engineered to handle the immense weight and forces of mooring an "Excellence-class" cruise ship (which can be over 340 meters long) or a massive floating offshore wind (FLOW) foundation.
- **Access and Mooring:** The floating berth would be connected to the existing wharf by an articulated bridge or walkway for passengers, equipment, and supplies. The vessels would moor directly to this pontoon, which would be equipped with heavy-duty bollards and fendering systems.
- **Secure Anchoring:** The entire floating structure would be held in place with a robust mooring system. This could involve driving a few large anchor piles into the seabed at a distance or using advanced anchor technologies like suction piles. This has a tiny seabed footprint compared to the widespread disruption of dredging.

3.2 Why This Approach is Environmentally Superior

This method is fundamentally about working *with* the harbour's natural geography rather than altering it.

- **No Contaminated Sediment Disturbance:** This is the biggest advantage. By avoiding dredging, you completely prevent the resuspension of toxic sediments, protecting the vital eelgrass, maerl, and oyster beds from being smothered and poisoned.

- **Preservation of the Seabed:** The only direct impact on the seabed would be the installation of the mooring anchors. This leaves the vast majority of the marine habitat untouched, allowing the existing ecosystem to thrive.
- **Maintained Water Quality:** Because there is no dredging plume, the water remains clear, protecting light-dependent habitats and avoiding the release of harmful contaminants into the water column.
- **Adaptability and Reversibility:** Floating structures are adaptable to changing needs and rising sea levels. In the distant future, they could even be removed, leaving a minimal long-term trace on the environment.

While this approach requires significant engineering and upfront investment, it aligns with modern environmental principles. For a location as precious and protected as Falmouth Harbour, it offers a sustainable way to achieve economic development without sacrificing the natural asset that makes it so unique.

4 Cofferdams

4.1 The Problem with Open-Water Dredging at Falmouth

The proposal to dredge nearly 1 million cubic metres and dispose of it at sea would cause severe environmental degradation in two main ways: during the **excavation** and during the **disposal**.

- **Resuspension of Contaminated Sediment:** The dredging process itself would churn up an estimated 50,0.00 cubic metres of fine sediment. Decades of harbour activity mean this sediment is laden with **toxic contaminants** like copper, mercury, and arsenic from historical anti-fouling paints. This creates a toxic plume in the water column.
- **Increased Turbidity:** The suspended sediment makes the water cloudy, blocking sunlight. This is devastating for vital local habitats like **eelgrass beds** and **maerl beds** (a rare, slow-growing coral-like algae), which need light to survive. These habitats are crucial nurseries for fish and other marine life.
- **Smothering of Habitats:** As the suspended sediment settles, it will blanket the seabed. This can smother and kill sensitive organisms that cannot move, including the maerl beds and the area's last natural **native oyster beds**.
- **Widespread Pollution:** The dredged material, along with its toxic contaminants, would be transported and dumped at sea, spreading the pollution over a much wider area and potentially damaging marine ecosystems for example in Gerrans Bay.

The Fal & Helford area is a **Special Area of Conservation (SAC)**, a legally protected marine zone, precisely because of these unique and fragile habitats. The proposed dredging method poses a direct threat to the very features the SAC is meant to protect.

4.2 How Cofferdams Provide an Environmentally Superior Alternative

A cofferdam approach fundamentally changes the construction methodology from an open-water, dispersive activity to a contained, controlled one.

A cofferdam is a temporary, watertight enclosure built in the water. Once sealed, the water is pumped out, creating a dry work area.

- **Containment of Contaminants:** A cofferdam would create a physical steel or concrete barrier around the new berthing pockets **before** any major excavation begins. All the contaminated silt and sediment would be trapped within this dry, sealed-off area. This completely prevents the formation of a toxic plume that would spread through the estuary.
- **Elimination of Turbidity:** Because all the digging happens in a dewatered environment, there is no significant suspension of sediment into the surrounding seawater. This protects the light-dependent maerl and eelgrass beds from being starved of sunlight.
- **Controlled Removal of Spoil:** The contaminated material can be excavated "in the dry." This allows for much safer and more controlled handling. Instead of being dumped at sea, it can be loaded onto sealed barges or transported by land and taken to a designated hazardous waste facility for proper treatment and disposal.
- **Protection of Benthic Life:** By isolating the construction footprint, the cofferdam ensures that the surrounding seabed, including the oyster and maerl beds, is not smothered by a blanket of resettled sediment.

In summary, the cofferdam method acts like a surgical tool, precisely isolating the construction zone and its associated pollutants. In contrast, the bucket dredging and sea disposal proposal is a sledgehammer approach that would cause collateral damage to one of the UK's most important marine conservation areas.14 While more complex and potentially more expensive upfront, the cofferdam approach is the only way to mitigate the catastrophic and long-lasting environmental damage the proposed dredging would inflict.

For a dredging project using a non-cofferdam approach in a sensitive location like Falmouth Docks, a comprehensive and rigorous environmental monitoring plan is essential. The goal is to provide real-time data to manage the environmental impact, ensure compliance with regulatory limits, and trigger immediate action if those limits are breached.

The monitoring plan should be active before, during, and after the dredging operations and should focus on three key areas: the water itself, the local ecology, and the physical dredging process.

The use of cofferdams is an entirely **realistic and well-established engineering solution** for a development of this nature, especially given the extreme environmental sensitivity of the location.

While it represents a higher upfront cost and a more complex construction process than open-water dredging, it is often the preferred method for major marine projects where environmental protection is a critical factor.

4.3 Technical Feasibility

From a purely technical standpoint, building a cofferdam to a depth of 10m below chart datum is standard practice in civil and marine engineering. Technologies such as **cellular cofferdams** (large, interlocking steel cells filled with aggregate) or **diaphragm walls** are routinely used for projects of a similar or even greater scale, including:

- **Dry dock construction**
- **Bridge pier foundations**
- **Seaport expansions and wharf construction**

The key technical challenges would be the specific seabed conditions at Falmouth Docks and the marine environment (tides and currents), but these are precisely the kinds of problems that modern geotechnical surveys and engineering designs are meant to solve. The technology is proven and capable.

4.4 Economic and Logistical Considerations

This is where the main trade-off lies. The decision is not about technical possibility, but about balancing cost against environmental responsibility and regulatory risk.

- **Higher Upfront Cost:** A cofferdam is undoubtedly more expensive in terms of materials (large quantities of steel), equipment (specialised marine rigs, cranes, barges), and labour.
- **The "True Cost" of Dredging:** The lower initial cost of dredging is misleading because it ignores massive external costs:
  - **Regulatory Risk:** A proposal to dump thousands of tonnes of toxic spoil into a **Special Area of Conservation (SAC)** would likely face years of legal challenges, public opposition, and planning delays. The cost of these delays could be enormous.
  - **Environmental Fines:** Causing significant, measurable damage to a protected habitat could result in substantial fines from regulators like the Marine Management Organisation (MMO).
  - **Reputational Damage:** The negative publicity associated with destroying a protected marine ecosystem can harm a company's reputation and social license to operate.

- **Long-Term Economic Loss:** Damaging the unique marine environment could impact local fishing (especially the oyster fishery) and tourism, which are vital to the Falmouth economy.

By choosing the cofferdam method, the developers trade a higher, but predictable, capital investment for a lower risk of project-killing delays, fines, and long-term environmental liability.

4.5 Conclusion: A Realistic and Responsible Choice

For a standard construction project in a non-sensitive area, open-water dredging might be considered the default option. However, in a legally protected and ecologically fragile location like the Fal and Helford SAC, the environmental constraints are so significant that they change the definition of what is "realistic."

In this context, a cofferdam is **not just a realistic suggestion; it is the most responsible and professionally sound engineering approach**. It is the only method that aligns with the principles of modern, sustainable development in a sensitive marine environment.

5 Monitoring plus Reuse / On-Land Disposal

There are hybrid approaches that could offer a very high degree of environmental protection for a lower upfront cost than a full cofferdam.

While it's difficult to match the perfect, hermetically sealed containment of a dewatered cofferdam, a combination of modern techniques can get very close by tackling the two main problems—excavation and disposal—in a controlled way.

The expected monitoring is described in Section 6.

5.1 The Best Alternative: Environmental Dredging + On-Site Dewatering

The most viable, lower-cost alternative is a multi-stage process that focuses on precision removal and secure containment, rather than building a massive structure.

5.2 Step 1: Precision Excavation with Environmental Dredging

Instead of using conventional "bucket dredges" that release huge plumes of sediment, this method uses specialized equipment.1 The most common is a **closed-clamshell dredge**.

- **How it works:** This dredge bucket has rubber seals and is designed to close tightly, preventing sediment from washing out as it's lifted through the water.2 Vents on top allow water to escape without disturbing the sediment inside. Think of it as using a sealed scoop instead of a leaky sieve.

- **Environmental Benefit:** This technique drastically **reduces sediment resuspension at the source** by up to 90% compared to traditional methods. It doesn't eliminate turbidity completely, but it contains the vast majority of the contaminated material within the bucket.

5.3 Step 2: On-site Containment with Geotextile Tubes

This step eliminates the need for at-sea disposal. The wet, contaminated slurry from the environmental dredge is immediately pumped into large, high-strength fabric bags called **geotextile tubes** (or Geotubes).

- **How it works:** These massive tubes are placed on a barge or a nearby shoreline area. As the dredged slurry is pumped in, the porous fabric allows the water to slowly seep out while trapping the solid contaminant particles inside. The escaping water can be filtered and treated to ensure it's clean before being returned to the harbour.
- **Environmental Benefit:** The contaminants are securely contained. Over time, the material dewaters and consolidates into a semi-solid, manageable state. This process completely **avoids dumping toxic spoil at sea**.

5.4 Step 3: Safe Final Disposal

Once dewatered, the geotextile tubes containing the now-solid sediment can be safely loaded and transported by truck to a licensed hazardous waste facility on land for final disposal or treatment.

5.5 How This Compares to a Cofferdam

- **Environmental Safety:** This hybrid approach is vastly superior to the original dredging proposal. While a small amount of sediment may still escape during excavation, it prevents the widespread plume and, most importantly, **achieves the same end result as a cofferdam: the safe removal and land-based disposal of contaminated material**.
- **Cost:** The upfront capital cost is significantly lower. It avoids the massive expense of purchasing, installing, and later removing the huge steel and aggregate structures of a cofferdam. The cost is focused on specialized dredging equipment and the handling/disposal process.

5.6 Other, Less Effective Measures

- **Silt Curtains:** A silt or turbidity curtain is a floating barrier that hangs down in the water to trap suspended sediment. While much cheaper, they are **not a complete solution**. They are prone to failure in strong tides and currents (like those in Falmouth) and only seek to contain a plume after it has been created. They are best used as a secondary, supporting measure rather than the primary method of protection.

In conclusion, the combination of **environmental dredging and geotextile tubes** presents the most realistic balance, offering a level of environmental safety that approaches that of a cofferdam for a considerably lower and more manageable upfront cost.

6 Best Dredging Practices

MLA/2025/00157 Marine Licence application while consisting of over 400MB of material is lacking in detail of the dredging methods to be used, beyond specifying use of a closed bucket and the disposal of certain shallow surface dredged material will not be at sea. More detail is provided of the environmental risks posed by the use of 20th century dredging methods through the modelling that has been carried out. The approach is providential rather than precautionary, as while many risks are identified almost all are stated as unlikely.

The environmental destruction that will be caused by the deposition of resuspended in the environment around Falmouth Docks by any standard dredging methods while modelled is considered to only cause damage which is minimal / short term or within the natural experience i.e. equivalent to storms. While storms move considerable amounts of materials they do not refine the material concentrating the entire toxic burden into a thin surface skimming which is the effect of dredging a contaminated sediment.

6.1 Water Quality Monitoring

This is the most critical real-time component. Monitoring stations should be set up at fixed locations: one "upstream" of the dredging (a control site), several around the immediate dredging area, and several further afield at sensitive receptor sites (e.g., near maerl beds, eelgrass, and oyster habitats).

What to Monitor:

- **Turbidity:** This is the measure of water cloudiness and the primary indicator of a sediment plume. It should be monitored continuously using in-situ sensors that provide real-time data.
- **Dissolved Oxygen (DO):** Suspended sediments can deplete oxygen in the water, harming marine life. This should be monitored continuously.
- **Contaminants:** Water samples should be taken frequently (e.g., daily or twice daily) and tested for the specific contaminants of concern identified in the sediment, such as:
  - Heavy metals (Copper, Mercury, Arsenic, Zinc, Cadmium)
  - Tributyltin (TBT) from historical anti-fouling paints
  - Polycyclic Aromatic Hydrocarbons (PAHs)
- **Nutrients (Nitrates and Phosphates):** The release of nutrients from sediments can trigger harmful algal blooms.

- **pH and Salinity:** To monitor for any significant changes in water chemistry.

How it Works:

- Buoys equipped with automated sensors can provide continuous, real-time data for turbidity and DO, which can be accessed remotely.
- For chemical analysis, survey vessels would collect water samples at different depths for laboratory testing.

6.2 Ecological Monitoring

This focuses on the direct impact on the sensitive marine life and habitats that make the Fal & Helford a Special Area of Conservation.

What to Monitor:

- **Sensitive Habitat Health:**
  - **Seagrass and Maerl Beds:** Regular diver or remote-operated vehicle (ROV) video surveys should be conducted to check for signs of stress, such as smothering by sediment or reduced light penetration. Photosynthesis levels (using Pulse Amplitude Modulation or PAM fluorometry) can be measured to assess their health in near real-time.
  - **Oyster Beds:** The health, mortality rate, and stress levels of the native oyster population should be monitored.
- **Marine Mammal Activity:**
  - A **Marine Mammal Observation (MMO)** programme must be in place. Trained observers should be on-site during all dredging operations to watch for species like seals, dolphins, and porpoises.
  - **Passive Acoustic Monitoring (PAM):** Underwater microphones (hydrophones) can be used to detect the presence of cetaceans, even when they are not visible at the surface.
- **Fish and Invertebrate Health:** Regular sampling of fish and shellfish outside the immediate dredge zone to test for the bioaccumulation of contaminants.

6.3 Physical Process Monitoring

This involves monitoring the dredging operation itself to ensure it is being carried out according to the environmental plan.

What to Monitor:

- **Plume Monitoring:** Visual observation and specialist sonar can be used to track the size, density, and direction of the sediment plume in real-time, ensuring it does not extend into protected zones.

- **Weather and Tides:** Continuously monitor meteorological and oceanographic conditions (wind speed, wave height, current velocity). Dredging should be paused if conditions are likely to spread the sediment plume uncontrollably.
- **Dredge Operations:** Onboard observers should verify that best practices are being followed, such as using environmental clamshells correctly and minimizing spillage from barges.

6.4 Action Plan: "Trigger Levels"

A crucial part of any monitoring plan is a pre-agreed set of **"trigger levels."** For example, if turbidity exceeds a certain level at a monitoring station near a seagrass bed, a clear action plan is initiated:

1. **Amber Level (Warning):** The dredging contractor is notified and must immediately review and modify their operational method to reduce the impact.
2. **Red Level (Stop Work):** If the amber level is breached for a sustained period or a higher red level is reached, dredging operations **must stop immediately** and cannot restart until the impact has subsided and the cause has been rectified.

This "monitor and respond" system is the only way to manage a high-risk, non-cofferdam operation without causing irreparable harm to the protected marine environment.

7 Faults in Application Documentation

Why are there no **MMO Sediment Quality Spreadsheets?** These spreadsheets enable an effective assessment of the contamination present in the sediment to be dredged.

The description of the methods of dredging needs to be far more detailed, for example the type of barges to be used for transport to disposal site are not described, **a hopper barge would present considerably increased risk of further contamination and so should not be allowed**.

There is no mention of repeating sediment quality measurements during the dredging process, so after the shallow material has been removed to landfill **there needs to be new sediment quality measurements made in order to ensure that the material remaining is still suitable for sea disposal**. Experience in the Tees has been that considerable contamination of the remaining and surrounding sea bed occurs during a clean dredge.

8 North East Marine Research Group

The North-East Marine Research Group (NEMRG) is an informal group of fishers from the North East Fishing Collective, academics from Durham, Newcastle, and Hull Universities, and interested individuals including representatives of community organisations including Climate Action Stokesley & Villages and Reclaim Our Sea and the Fishmongers' Company's Fisheries Charitable Trust.

Together the group works:

- *to understand the cause of the Tees Estuary ecocide event of September 2021*
- *to understand persistent issues occurring in the marine ecosystem*
- *to provide information relevant to sound environmental governance to properly safeguard the Tees environment, wider marine ecosystem, and the industries that rely on it.*