Falmouth Marina Dredging - Environmental Impact Assessment

Environmental Statement

Non-Technical Summary
This report has been prepared for in accordance with the terms and conditions of appointment for Falmouth Marina dated 28 September 2008. Hyder Consulting (UK) Limited (2212959) cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.
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1 Introduction

Falmouth Marina is a leisure marina complex located in the north of the town on the Penryn River, an inlet of the extensive Fal Estuary.

The marina is currently suffering from a build up of silt that is prohibiting its effective operation and threatens its long-term viability. Site investigations have identified traces of contaminants in the sediment including Tributyltin (TBT). TBT is a toxic chemical commonly used as an anti-fungal agent in marine paints. When released into the aquatic environment it poses a risk to various species of marine life, including molluscs and mammals, where it can extend into the food chain. A series of technical and environmental studies have informed the development of a preferred option for the dredging of the marina, including removal and subsequent disposal of potentially TBT-contaminated sediments (‘the Project’).

This document presents a summary of the results of an Environmental Impact Assessment (EIA) of the Project on the surrounding environment. An EIA is a legally required procedure for certain types of development and comprises a detailed analysis of the potential effects of a proposed development on the environment. The EIA is an important part of the decision-making process.

A more detailed account of the EIA and its findings are available in the Environmental Statement (ES). This has been produced by technical specialists following site and desk-based surveys and examines aspects of the environment where significant impacts are possible. The EIA predicts impacts using a variety of means and established methodologies and sets out measures that will be undertaken to avoid, reduce or eliminate those impacts, known as mitigation measures. The ES has been submitted to the Marine Management Organisation (MMO) along with an application for a licence to carry out the Project under the Food and Environmental Protection Act (FEPA) 1985 and the Coast Protection Act (CPA) 1949.

Copies of the ES will be made available to the general public for inspection at:

Falmouth Library
Municipal Offices
The Moor
Falmouth
TR11 3QA
Email: falmouth.library@cornwall.gov.uk

Library opening hours are 0930 – 1800 Monday, Tuesday, Thursday and Friday, and 0930 – 1600 Saturday.

Any enquiries should be addressed in writing to:

Marine Environment Team
Marine Management Organisation
PO Box 1275
Newcastle upon Tyne
NE99 5BN
Telephone: 0300 123 1032
E-mail: marine.conents@marinemanagement.org.uk
2 What is Proposed?

Description of the Project

Previous site investigations have shown that contamination is largely confined to the top 1.0m of the sediments within the marina. However, a total of 2.2m requires removal for operational purposes. The Project therefore makes a distinction between contaminated sediment in the upper layers, and the ‘clean’ sediment beneath.

The area to be dredged would be divided into individual trenches and a barge-mounted excavator would be used to remove the first 0.2m to 3.0m (average 1.1m) of sediment. This method is very accurate in both position and depth, is suitable for confined spaces, and causes minimal disturbance and dilution of the material being dredged. The dredging barge would held in position by spud legs or mooring ropes attached to pontoons and moored alongside a larger storage barge.

A land-based excavator would then transfer the contaminated material to lorries for transport to Dubbers Tip, a former china-clay works near St Austell, where it would be used for restoration and remediation purposes. The site’s operators, 4Recycling, hold waste licences for the activities at the tip, which are not covered by the FEPA / CPA licence application, or by this EIA.

A bottom layer of clean material would then be dredged to a depth of 2.2m and loaded into bottom-dump barges for disposal at a spoil ground in Falmouth Bay already designated for disposal of material from maintenance dredging in the Fal Estuary. Disposal at sea has been the method used for previous disposal licences at the marina.

The dredging operation would be able to take place without closing the marina to boats, although temporary disruption would occur to navigation within the marina itself. The dredging sequence has been developed so as to minimise impact on moored and visiting vessels.

Mitigation

The Project has been designed so as reduce or eliminate adverse impacts on the environment. Measures included for this purpose are known as mitigation. A number of mitigation measures have been proposed throughout the EIA process and these are listed in the main ES. The principal measures are described below:

A silt curtain would be used to screen each dredging area, prior to dredging, to prevent suspended sediments from being transported away from the site. This is a flexible screen that is placed vertically around the area to be dredged, from the seabed to above the surface. It would remain in place for a further period of time after the dredging of the cell had been completed and suspended solids adjudged to be below harmful levels.

The land-side handling of contaminated material would be subject to a method statement containing environmental control procedures to be agreed under the Environmental Management Plan (EMP) for the Project. The lorries transporting the material would be sealed and sheeted to prevent spillage or dust blow in transit. There are predicted to be ten return trips per day occurring during normal marina operational hours for the duration of the dredging period (approximately four months, seven days per week). Two different routes would be followed by the lorries in order to minimise the impact on local roads.

In addition it is proposed that sediment monitors are placed downstream of the marina to monitor any accidental releases during the dredging works.
Alternatives

The EIA is required to examine the alternative options considered for achieving the aims of the Project. Proposals for dredging the marina and subsequent treatment / removal of the contaminated sediments have been in development for a number of years and the Project as described above represents the culmination of several technical and feasibility studies designed to arrive at the optimal solution from a technical, economic and environmental perspective.

Site investigations in mid-2009 were used to establish two potential options for the dredging and disposal / re-use of sediment:

- Over-dredging: a method of dredging whereby contaminated sediments are buried at depth and sealed with a capping layer of clean imported sand. The initial excavation would be to a depth of 3.7m to accommodate the contaminated over-dredge and capping material whilst still achieving a post-dredge depth of 2.2m.
- Land restoration: this was taken forward as the Preferred Option as described above.

The two options were assessed in an Environmental Options Report in December 2009. An environmental scoping workshop in February 2010 was attended by representatives from Premier Marinas, Hyder, the Marine and Fisheries Agency (now the Marine Management Organisation), the Centre for Environment, Fisheries and Aquaculture Science, the Environment Agency, Natural England, Cornwall Council and 4Recycling. The Preferred Option was identified at this workshop with full consideration of the potential environmental impacts of the two options.

3 Assessment of Environmental Impacts

During the scoping exercise at the beginning of the EIA process, it was decided that four environmental topic areas would be considered in detail. The Project was considered to have no potential impacts on landscape / seascape, noise and vibration, air quality, cultural heritage and archaeology, and socio-economics and amenity. These topics were therefore scoped out of further assessment.

Marine and Coastal Ecology

The study area upon which this assessment is based includes the Fal Estuary extending west of Falmouth Marina (Penryn River) and east to Penarrow Point and Pendennis Point.

A desk study was undertaken to gather ecological information from previously studies undertaken in the Falmouth area, including published and online data. In addition, a marine ecology survey was undertaken in June 2010 using both drop-down video recording and grab samples. The video footage and samples were analysed in order to identify the habitats and species present.

Three designated nature conservation sites exist within the study area – the Fal and Helford Special Area of Conservation (SAC), the Lower Fal and Helford Site of Special Scientific Interest (SSSI) and the Flushing Beach County Wildlife Site (CWS). The potential impact of the Project on these sites has been assessed by considering the qualifying habitats and species for which they are designated.

The desk and field studies have identified Key Ecological Receptors (KER) that could be affected by the Project. The assessed impacts of the Project upon these habitats and species are indicated in the table overleaf. This identifies which of the six potential impacts apply to which of the KERs, and the significance and duration of the expected impact.
### Key Ecological Receptor

<table>
<thead>
<tr>
<th>Value</th>
<th>Inter-tidal Mudflats</th>
<th>Inter-tidal Rocky Shore</th>
<th>Benthic Communities</th>
<th>Fisheries</th>
<th>Marine Mammals and Basking Sharks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present in SAC UK Biodiversity Action Plan priority habitat</td>
<td>Present in SAC</td>
<td>Primary reason for SAC selection UK Biodiversity Action Plan priority habitat</td>
<td>Potential to support nationally protected species</td>
<td>Regional importance</td>
<td>District / Borough importance</td>
</tr>
</tbody>
</table>

### Increased levels of suspended sediments and turbidity associated with physical disturbance

<table>
<thead>
<tr>
<th></th>
<th>Inter-tidal Mudflats</th>
<th>Inter-tidal Rocky Shore</th>
<th>Benthic Communities</th>
<th>Fisheries</th>
<th>Marine Mammals and Basking Sharks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-term</td>
<td>Neutral – Minor Adverse</td>
<td>Neutral – Minor Adverse</td>
<td>Short-term (sheltered muddy gravels &amp; sub-tidal sand)</td>
<td>Short-term</td>
<td>Neutral – Minor Adverse</td>
</tr>
</tbody>
</table>

### Potential risk of accidental spillage of fuel and other construction contaminants

<table>
<thead>
<tr>
<th></th>
<th>Inter-tidal Mudflats</th>
<th>Inter-tidal Rocky Shore</th>
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<th>Fisheries</th>
<th>Marine Mammals and Basking Sharks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-term</td>
<td>Neutral – Minor Adverse</td>
<td>Neutral – Minor Adverse</td>
<td>Short-term (sheltered muddy gravels and sub-tidal sand)</td>
<td>Short-term</td>
<td>Neutral – Minor Adverse</td>
</tr>
</tbody>
</table>

### Liberation of contaminants from harbour sediments

<table>
<thead>
<tr>
<th></th>
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<th>Fisheries</th>
<th>Marine Mammals and Basking Sharks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-term</td>
<td>Moderate Beneficial</td>
<td>Moderate Beneficial</td>
<td>Long term Neutral – Minor Adverse (potential spread of contamination)</td>
<td>Short-term</td>
<td>Neutral – Minor Adverse</td>
</tr>
</tbody>
</table>

### Habitat loss

<table>
<thead>
<tr>
<th></th>
<th>Inter-tidal Mudflats</th>
<th>Inter-tidal Rocky Shore</th>
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<th>Fisheries</th>
<th>Marine Mammals and Basking Sharks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-term</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Neutral</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Increased noise and light

<table>
<thead>
<tr>
<th></th>
<th>Inter-tidal Mudflats</th>
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</thead>
<tbody>
<tr>
<td>Short term</td>
<td>Neutral – Minor Adverse</td>
<td>Neutral – Minor Adverse</td>
<td>Neutral – Minor Adverse</td>
<td>Neutral – Minor Adverse</td>
<td>Neutral – Minor Adverse</td>
</tr>
</tbody>
</table>

### Improved quality of prey species through the reduction of toxins in the food chain

<table>
<thead>
<tr>
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<th>Marine Mammals and Basking Sharks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-term</td>
<td>Minor Beneficial</td>
<td>Minor Beneficial</td>
<td>Neutral – Minor Adverse</td>
<td>Neutral – Minor Adverse</td>
<td>Neutral – Minor Adverse</td>
</tr>
</tbody>
</table>
Increase in Suspended Sediment and Turbidity (Cloudiness) – The Project is likely to cause small increases in suspended sediment concentrations in the Penryn River during the dredging operations. Turbid water poses a risk of smothering inter-tidal and benthic (bottom-dwelling) species and may interfere with fish and marine mammal movements. The effects would be mitigated by use of a silt curtain to contain sediment within the working area. Turbidity meters would be located outside the marina to provide early warning of excessive turbidity, and, if triggered, would cause work to be suspended. There would be some small adverse residual impacts upon all KERs from increases in turbidity; however these are considered to be of only neutral – minor significance and of short term duration, except for the effect on seagrass and maerl beds which could be affected over a longer period.

Spillage risk – The use of plant and equipment poses a risk of spills of fuels, oils and chemicals into the Fal Estuary which would be toxic to all KERs. Best practice pollution control procedures would be adopted during the Project and the risks are therefore considered to be neutral – minor on all KERs. If released, toxins may persist in the environment or be passed on through the food chain.

Liberation of contamination – The removal of contaminants from the Fal Estuary ecosystem would benefit inter-tidal and benthic communities in the long-term. However, the potential release of TBT into the estuary during the dredging work may pose a short-term risk to benthic species and fish.

Habitat loss – The loss of suitable habitat for bottom-feeding fish is not considered to be significant.

Increased noise and light – Working hours and practices would be established to minimise noisy activities and the use of artificial lights. However, some slight short-term disturbance to fish and marine mammals may be expected.

Removal of toxins from food chain – Occupying the top tiers of the food chain, marine mammals and basking sharks would benefit in the long term from the removal of TBT from the ecosystem.

Neither the transport of contaminated material to Dubbers Tip, nor the transfer of clean sediment to the disposal site in Falmouth Bay would have any impacts upon marine and coastal ecology.

It is not considered that the Project would have a cumulative impact with other dredging projects proposed for the Fal Estuary. The Project would not coincide either temporally or spatially with other dredging activities and the use of silt curtains would prevent many of the potentially adverse impacts of the Project from spreading to adjoining areas.

Hydrodynamics and the Sedimentary Regime

This chapter considered the potential impacts of the Project on currents, tides and waves within the Fal Estuary, as well as on the migration and deposition of sediments. The assessment mainly focussed upon Falmouth Marina itself as any impacts were expected to be highly localised, although the Penryn River and the lower part of Carrick Roads as far as Pendennis Point were also considered.

The assessment considered the impact of the Project on five separate aspects of the environment in relation to this chapter. The results are summarised below:

- Bathymetry (Water Depth) – The project would increase the average depth in the outer marina to approximately 5.4m, an increase of approximately 20%. There may be some small changes to tidal current speeds as a result, but these would be barely perceptible.
Tidal Water Levels – The area to be dredged is very small relative to the estuary as a whole. Tidal water levels would be unaffected and there would be no change in tidal flood risk.

Tidal Current Speeds – Deepening the outer marina would cause current speeds to decrease slightly. This would not affect deposition rates, but may have some slight impacts on sediment dispersion by suspension or solution.

Wave Climate – The distance over which the wind has blown (the ‘fetch’) is likely to be the limiting factor determining wave height rather than water depth, and as the fetch would remain unchanged by the Project, it is unlikely that wave heights would be increased beyond existing levels.

Sedimentary Regime – The dredging operations would stir up sediments on the bed of the marina and would create the risk of the formation of sediment plumes, which may then move into the wider Fal Estuary. However, the proposed dredging method includes the use of silt curtains to contain the majority of the resuspended sediment. This should minimise the amount of sediment which could escape into the main channel. Nevertheless, minor changes in suspended sediment levels are possible along a 3km reach of the Penryn River.

Neither the transport of contaminated material to Dubbers Tip, nor the transfer of clean sediment to the disposal site in Falmouth Bay would have any impacts upon hydrodynamics and the sedimentary regime.

No cumulative impacts were identified with other projects in the Falmouth area.

Water Quality

This chapter considers the impact of the Project on the water quality of the marina and surrounding area. The study area for the assessment comprises the Penryn River and lower Carrick Roads parts of the Fal Estuary.

The release of contaminated sediment into the waters of the marina and potentially the wider estuary has the potential to increase TBT levels as the chemical becomes separated (desorped) from sediment particles and dissolved into the water. The assessment has also considered the potential for changes in turbidity (‘cloudiness’) and dissolved oxygen levels, which can be affected by increased suspended sediment concentrations. This can lead to reduced light availability and physical impacts on flora and fauna.

- Turbidity – The silt curtain to be erected during the dredging operations has been assumed to be 80% efficient. This suggests a potential change in turbidity levels of 2mg/l, well below the average levels in the estuary of 10mg/l. This relatively small change, together with the short-term duration of the Project indicates a neutral impact.

- Dissolved Oxygen – There would be a neutral impact on dissolved oxygen levels as the introduction of organic sediments into the water would occur over a highly localised area.

- TBT Concentration - The available water quality information for the Fal Estuary indicates that the chemical quality is low and that levels of TBT already exceed the 2ng/l recommended standard. Predictions of TBT concentrations within the sediment plume are 0.5ng/l, lower than the standard. This, together with the short-term duration of the Project, indicates a neutral impact.

Neither the transport of contaminated material to Dubbers Tip, nor the transfer of clean sediment to the disposal site in Falmouth Bay would have any impacts upon water quality.
No cumulative impacts were identified with other projects in the Falmouth area. Any impacts from the Project would be insignificant when combined with those from proposed dredging activities associated with the Port of Falmouth Development Initiative and new Port Falmouth Marina. Neither the timing or geographical extent of the Project would coincide with more local proposed developments.

Sediment Quality and Contamination

This chapter considers the potential for contamination to spread as a result of disturbance and movement of the marina sediments during the Project. Potential impacts are considered to be highly localised and the study area for the assessment therefore considers the marina and its immediate surrounds.

During the dredging works there is the potential for sediment to be remobilised and become suspended in the water column. This is considered to have a short term effect as the sediment is likely to re-settle after time. Use of silt curtains would help to prevent the spread of contaminated sediment, but there can be expected to be some transmission into the wider Fal Estuary. The presence downstream of the Fal and Helford SAC indicates that this impact should be considered to be slight adverse. An accompanying Habitats Regulations Assessment has confirmed that these changes would have no impact upon the SAC itself.

Transportation of contaminated sediment by road to Dubbers Tip would be carried out using sealed and sheeted lorries to prevent loss or spillage of material. The loading area would be covered with wood chips to soak up any spillages, which would also be sent to the tip after use. Accordingly, there is not considered to be an impact from the transport of contaminated sediment.

Clean sediment to be disposed of at the Falmouth Bay spoil ground would be tested prior to transport to ensure that no residual contamination is present. There is not considered to be an impact from transportation to the spoil ground.

The removal of contaminated sediment during the Project would be of benefit to the marine environment in the long term and cumulative impacts with other projects would not therefore be possible. However, those occurring nearby, notably the proposed dredging of the Inner Basin of Falmouth Marina, should adopt suitable mitigation to prevent re-contamination of the Outer Basin.

4 Conclusion

The assessments have concluded that the Project would not lead to significant environmental effects by itself or in combination with other planned projects. It would cause some short-term increases in suspended sediment concentrations, although silt curtains would be erected around the dredging works to control this. Some ecological habitats and species may experience a slight risk due to increased turbidity and an increased risk of pollution during the works. Pollution control measures would be adopted to mitigate any possible spills or leaks. Consequently, it is not considered that this would result in a significant effect upon the integrity of the Fal and Helford SAC, an internationally protected conservation site. Further details of this are covered in a Statement to Inform an Appropriate Assessment.

The Project would benefit the marine ecosystem in the long-term by removing contamination from the sediments within the marina basin. It is not considered that remobilising the sediments during dredging would have an impact upon the quality of water in the Fal Estuary.

Neither the transport contaminated material to Dubbers Tip, nor the transport of clean sediment to the Falmouth bay spoil ground would have a significant impact on the environment.