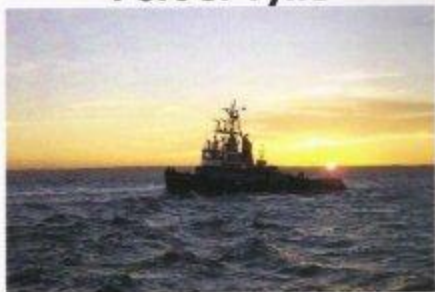




## Port of Tyne



### Sea Disposal Trials of Contaminated Tyne Estuary Sediment:

### Post Placement Monitoring - Tier 1 Second Annual Monitoring

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Development Services



Catchment Management



Sustainability

## 5. RESULTS AND DISCUSSION

### 5.1 Bathymetric Survey

Additional capping works were undertaken between July and December 2006. The bathymetry survey was undertaken in September 2007 following these works.

The volume of material deposited between the 2006 survey and the 2007 survey was 119 678m<sup>3</sup> of which the vast majority was sand. A full breakdown of the volumes and location of the material deposited is provided in Appendix VII.

A bathymetric multi-beam survey was undertaken in September 2007 as part of the second annual monitoring works. The method outline is contained in Appendix I. This was undertaken following deposition of the additional capping material.

In addition to the September 2007 survey a further survey was undertaken in May 2008, the results of which are discussed below. Further information on the interpretation of the surveys specific to this report is provided in Appendix VIII.

Five bathymetric surveys have previously been undertaken at the disposal area, showing the bathymetry at three stages in the trial process: predisposal, post placement of the CDM (but prior to capping), and post capping. The pre-disposal bathymetry showed that the main area of the disposal ground had a gentle gradient that progressively dipped towards the east with a slope of approximately 1:300. A more extensive description of the bathymetry of the entire Souter Point Outer Disposal Ground is provided in the Pre-Disposal Report No 1999 (EnviroCentre, 2005(a) Report No. 1999).

The bathymetric measurements following placement of the CDM (EnviroCentre, 2005(c) Report No. 2034) showed that the CDM had been placed within the design area and displayed a relatively uneven surface/thickness with a number of peaks and troughs noted. The bathymetric measurements following capping of the CDM (EnviroCentre, 2005(d) Report No. 2045) showed a more rounded and even morphology across the site with an obvious significant increase in material on the seafloor (the cap).

Comparison of the post-capping bathymetric data and the post-CDM placement data presented in the short term monitoring report (EnviroCentre, 2005(d) Report No. 2045) provided only a limited indication of the capping thickness as consolidation and slumping of the CDM occurred as material was placed on top of it. It does however give an indication of the extent of material placed and where slumping and consolidation have most occurred. It showed that consolidation of the CDM was likely to be occurring and that it was uneven in nature. The thickest areas of capping were in the centre of the disposal site with up to 1.0m of cap likely. This was confirmed by the June 2005 sub-

## 6. CONCLUSIONS

The combined evidence from the survey provides evidence that a significant cap was present across the majority of the disposal ground.

The seismic surveys show some changes in the areal extent of the sediment from the 2006 work. There has been some movement of the sediment to the south, the predominant current direction being to the southeast. Whilst changes are evident in the SSS data set the significance of this change relative to the cap integrity is limited. The majority of the changes noted with regard to the seismic data are considered to be a reflection of both natural sedimentation and movement of surficial sediments. No major changes are noted in the sea bed profile within the resolution limits of the sub-bottom profiling with between 0.5m and 1.0m of cap present across the CDM.

No evidence of uncovered CDM was evidenced by the SPI work with the exception of one location at the extreme northwest of the site. The SPI camera work provided further evidence of limited movement of the cap with slightly more sand cap noted in the southerly stations relative to those in the northern area. The extent of change was however, noted to be <10cm.

Coring work provided evidence that the cap was variable in thickness even within the central area of the cap. The average cap thickness noted from the cores is 37cm with a maximum of 61cm in the centre of the site.

Despite evidence suggesting that there had been some movement of sediment in the intervening year TBT concentrations at the cap were below Action Level 1 in all cases with the exception of one sample. Relative to the 2006 data there was an increase in the number of samples containing concentrations of heavy metals above Action Level 1.

The benthic life at the site has continued to show progress in returning to baseline levels.

The weight of evidence suggests that despite change in the morphology of the cap and some degree of sediment movement in the period June 2006 – May 2008 the cap has maintained its function. Furthermore the cap has met the agreed specification and therefore no replenishment works are deemed necessary at this time. As such there is not considered to be any significant environmental risk from the CDM at this time.

## 7. SUMMARY

Two years on from the capping of CDM at Souter Point Outer Disposal Ground significant knowledge has been gained on the use of this technique as a solution for the disposal of contaminated sediments.

The most recent bathymetric data (May 2008) indicates that there is a significant cap present across the central portion of the site and that the cap meets the specification agreed with DEFRA in June 2008. At present the CDM is isolated from the marine environment however it is recognized that additional replenishment works will be required in near future to provide additional comfort over the medium term (greater than 2 years).

The non bathymetry data recorded in June 2007 revealed that despite some evidence that the cap had been denuded in some areas concentrations of TBT were below guideline values in all but one sample from the cap with the majority being below the limit of detection. As such the cap was maintaining its function. Further comfort with regards the longer term stability of the cap can be taken from the limited differences between the September 2007 bathymetric survey and the May 2008 survey despite there having been three significant storm events.

Ensuring that regular bathymetric surveys and analysis of the results to a set procedure will ensure management of the cap can be undertaken appropriately over the long term. The process of monitoring followed by replenishment if necessary will ensure that the marine environment is protected and that this method of disposal considered appropriate.