

WASTE MANAGEMENT FOR DREDGINGS OPERATIONS

- a good practice guide for navigation authorities



**Association of
Inland
Navigation
Authorities**

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Preface

Over the last five years or so, waste management legislation has become increasingly complex as the UK Government has implemented a number of EU Directives. The changes in legislation have had a significant impact on the dredging industry including navigation authorities' operations.

This good practice guide has been delivered by the Association of Inland Navigation Authorities (AINA) following significant progress made over recent years by the sector-wide "Wet Dredgings Group" to assist the understanding and interpretation of legislative requirements applicable to dredgings activities in the most practical and economic manner whilst safeguarding the environment. By using this guidance greater scope for the sustainable re-use of dredged material may be achieved, perceived ambiguities in some regulations can be minimised and greater consistency in operational and regulatory approaches will be assured. This guidance relates only to England and Wales. A separate version made relevant to Scotland may be developed in due course.

Facilitation of the Wet Dredgings Group has been led by the Department for the Environment, Food and Rural Affairs (Defra) and representation on the group has included government officials from Defra (Inland Waterways, Waste Policy and Water Quality Directorates), Her Majesty's Revenue and Customs (HMRC) and the Environment Agency as regulator; alongside dredgings operators from inland navigation authorities (including British Waterways, the Environment Agency and the Broads Authority), and dredging contractors.

The sector remains in a position of ongoing legislative and regulatory change. To account for this situation, the guidance has been published in 'live' electronic form via the AINA website at www.aina.org.uk and will be updated regularly by AINA to which responsibility for the ongoing facilitation and administration of the Wet Dredgings Group has been transferred

Foreword

Introduction

Dredging is an activity essential to navigation, maintaining the ecology and biodiversity of waterways and adjacent land, the management of flood risk and drainage activity. The consequences of not dredging, or carrying out limited dredging, can be significant.

The purpose of this Guide is to help navigation and drainage authorities to understand and interpret current legislative requirements applicable to dredging activities in the most practical and economic manner whilst safeguarding the environment. The guidance covers activities taking place in England and Wales as the regulatory regime in Scotland is different. Separate guidance covering the regulatory requirements in Scotland will be available shortly.

We are in a period of ongoing regulatory change; to account for this, the guide will be updated on a regular basis.

Best Practice

The best practise solution to any dredging project takes into account many issues and there is no one solution for all situations. Where appropriate, the solutions that do not generate a waste are likely to be most cost effective. However, these may have a higher impact on the environment than other possible solutions. Getting the balance right is more a matter of judgement/experience than of pure science/economics.

The properties (both physical and chemical) of dredgings can greatly affect the choices available for re-use, recovery and disposal. Where free draining sands and gravels are generated the opportunities for re-use as secondary aggregates exist. Whereas, opportunities to re-use the more organic water retaining silts are generally related to backfilling or beneficially conditioning agricultural land (often referred to as land spreading) and ecological improvements. Combinations of disposal routes may be necessary to achieve the most cost effective and environmentally acceptable solutions.

1. Legislation Overview

Dredging has been an ongoing requirement since the early days of waterways and waste from dredging operations has been subject to EU waste management controls for over 30 years. These controls were introduced on the adoption of the original Waste Framework Directive (75/442/EEC) in 1975 and implemented in the UK in 1976 by means of the Control of Pollution Act 1974 and associated Regulations.

The Control of Pollution (Licensing of Waste Disposal) Regulations 1976 (S.I. 1976 No.732) classified as industrial waste, “waste produced as a result of dredgings operations”.

The 1976 Regulations defined “dredging operations” as including “the removal of anything forming part of or projecting from the bed of the sea or any inland water, by whatever means it is removed and whether or not at the time of removal it is wholly or partly above water”.

The 1976 Regulations also provided an exemption from the waste management licensing system then in force where “waste produced in the course of dredging operations for the purpose of land drainage or the maintenance of a watercourse, is deposited along the banks of a watercourse”.

The 1976 Regulations provisions were re-enacted in the Collection and Disposal of Waste Regulations 1988 (S.I. 1988 No.819).

The current provisions are contained in the Controlled Waste Regulations 1992 (S.I. 1992 No.588) Schedule 3 paragraph 5 which classifies “waste from dredging operations” as industrial waste; and the Environmental Permitting (England and Wales) Regulations 2007 (S.I. 2007 No. 3538) Schedule 3, paragraph 25, which provides an exemption from an environmental permit for waste arising from dredging operations.

The original Waste Framework Directive has now been supplemented by other EU legislation which directly or indirectly affects the recovery and disposal of dredgings e.g. the Hazardous Waste Directive and the Landfill Directive.

As a result of devolution, there are regulatory variations between England/Wales and Scotland. This may result in differing costs, but does not currently present any operational difficulty. It is possible that the Welsh Assembly Government may, in the future, introduce their own regulations which may differ to legislation in England and could have implications for operations on waterways which cross over the England/Welsh border. There is a range of legislative tools for regulating waste recovery and disposal operations. Examples of these are:

- Exemptions from environmental permits (both simple and complex)
- Environmental Permits

Not all these options apply to dredged materials; those that normally apply are discussed in Section 2.

1.1 Definition of Waste

Article 1, 1(a) of the Waste Framework Directive (2006/12/EC) provides that:- "waste" is "...any substance or object...which the holder discards or intends or is required to discard."

There is no definitive list of what is and is not waste. Whether or not a substance is discarded as waste, and when waste ceases to be waste, are matters that must be determined on the facts of the case and the interpretation of the law is a matter for the Courts. It rests, in the first place, with the producer or holder of a substance to decide whether it is being discarded as waste and the Environment Agency is responsible, as a "competent authority", for implementation of the waste framework directive in England and Wales — including its definition of waste.

Since the definition came into force the European Court of Justice ("ECJ") and our National Courts have issued several judgments on the interpretation of the definition of waste and the meaning of "discard". ECJ judgments are binding on Member States and their competent authorities. A summary of ECJ judgments on the interpretation of the definition of waste is available on the Defra website at: <http://www.defra.gov.uk/environment/waste/topics/index.htm>.

The **European Waste Catalogue (EWC)** contains a list of all types of waste and each waste type is given a six-digit code:

- some wastes, called 'absolute entries', are **always classed** as hazardous, for example inorganic wood preservatives, organic solvent based waste paint or varnish remover and wastes from asbestos processing. These wastes are identified in the EWC with an asterisk (*)
- other wastes, called 'mirror entries', are classed as hazardous if contaminants are present in amounts **above certain threshold** concentrations, for example some wastes containing arsenic or mercury.

1.1.1 Inert Waste

The definition of inert waste in Article 2 (e) of the Landfill Directive is:

'Inert waste' means waste that does not undergo any significant physical, chemical or biological transformations.

'Inert' waste will not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm to human health.

The total leachability and pollutant content and the ecotoxicity of its leachate are insignificant and, in particular, do not endanger the quality of any surface water or groundwater.

1.1.2 Hazardous Waste

Hazardous waste is waste that may be **harmful** to human health or the environment. Examples of hazardous wastes include:

- asbestos
- certain chemical wastes
- certain healthcare wastes
- electrical equipment containing hazardous components such as cathode ray tubes or lead solder
- fluorescent light tubes
- lead-acid batteries
- oily sludges
- pesticides
- Solvents

1.1.3 Non Hazardous Waste

Is waste that is not hazardous.

1.1.4 Contaminated Waste

The term 'contaminated waste' is often confused with 'hazardous waste'; they are not the same.

'Contaminated' can be defined as an impairment of quality by an undesirable substance not normally present, degradation of natural quality as a result of man's activities or unusually high concentrations of naturally occurring substances. Whether or not contaminated material is hazardous is related to the types and concentrations of substances present.

1.2 Environmental Permitting

An Environmental Permit (EP) is a legal document, issued under Regulation 13(1) of the Environmental Permitting (England and Wales) Regulations 2007 (EPR 2007).

Environmental Permits, which are issued by the Environment Agency, are permits for the purposes of the Waste Framework Directive and their purpose is to ensure that waste is recovered or disposed of in ways that protect the environment and human health.

There are two types of permits: a site permit (authorising the deposit, recovery or disposal of controlled waste in or on land), or a mobile plant permit (authorising the recovery or disposal of controlled waste using certain types of mobile plant).

The disposal of non-hazardous dredgings into a tip or lagoon alongside inland waterways is regulated by an environmental permit.

1.2.1 Technical Competence (Operator Competency)

The Environment Agency must refuse an application for the grant or transfer of an environmental permit if it is not satisfied that the applicant:

- a) will be the operator; or
- b) will operate in accordance with the permit.

The definition of operator is given by Regulation 7. Details of how the Environment Agency decides whether an operator is likely to comply with the permit can be found in section 8 of the EP Core Guidance at <http://www.defra.gov.uk/environment/epp/documents/core-guidance.pdf>

Operators of permitted waste activities must demonstrate their technical competence by satisfying the requirements of an approved technical competence scheme. Two schemes have initially been proposed:

- i) a variation of the previous WAMITAB scheme; waste activities are categorised as low, medium or high risk. Operators ensure their activities are managed by someone with an appropriate qualification. Technical competence must be maintained, and is assessed every two years.
- ii) based on written competence management system (CMS); operators write a CMS to an agreed industry standard to identify necessary skills, ensure suitably qualified people fill key posts, and deliver training and development to fill skill gaps. The CMS is independently audited and accredited annually.

WAMITAB Certificates of Technical Competence (CoTC) awarded under the previous waste management licensing regime are still valid under EPR 2007 but the level of Award for a particular site may vary depending on where it falls within the permitting hierarchy.

Any CoTC holder who was technically competent for an activity under the old scheme will not need to obtain another award. Neither will people who passed an Environment Agency assessment or who benefited from 'deemed' competence. However, everyone will now have to pass the 2 year 'continuing competence' assessments.

More information on the new technical competence schemes can be found at www.defra.gov.uk/environment/epp/index.htm

1.2.2 Obtaining an Environmental Permit

To landfill non-hazardous dredgings adjacent to the watercourse they are coming from, requires an environmental permit.

The requirements for applications are set out in Schedule 5 to EPR 2007. The application must:

- be made by the operator (though it may be made by an agent acting on behalf of the operator)
- in case of a transfer application, be made by the current operator and future operator
- be made on the form provided by the regulator
- include the information required by the application form, and
- include the relevant fee

An applicant can withdraw an application at any time before it is determined but the regulator is not obliged to return any of the application fee.

Application forms

Operators must use the forms provided by the regulators to make their applications and application forms should:

- be clear and simple to understand
- identify any administrative and technical information required
- require the information required by any relevant Directive(s)
- require, where relevant, the assessment of the potential impact on the environment and human health
- require, where relevant, a level of detail proportionate to the environmental risk, and
- be sufficiently comprehensive to enable operators to submit complete applications

Application forms and further guidance on environmental permitting applications may be found at:

www.environment-agency.gov.uk/business/1745440/1745496/1906135/1985710/?version=1&lang=e

1.3 Exemptions from Environmental Permits

The Waste Framework Directive enables Member States to adopt general rules providing exemptions from the Directive's permit requirements.

The UK is one of a very few Member States to make significant use of this discretion and has provided a wide range of permit exemptions – mainly to encourage the recovery and recycling of waste. The exemptions are provided in Schedule 3 to the EPR 2007. If a waste management activity is exempt then an environmental permit is not required.

The exemptions from environmental permits are mainly for waste recovery and recycling operations and are provided within the terms of the Waste Framework Directive. This means that they are provided on the basis of "general rules" which set conditions to protect the environment and human health; and specify the waste activity subject to exemption and the types and quantities of waste which may be disposed of or recovered under the terms of it.

The Waste Framework Directive's key objective – which applies to exempt activities as well as those carried out under the terms of a permit - is to ensure that waste is recovered or disposed of without endangering human health and without processes or methods which could harm the environment and in particular without:

- Risk to water, air, soil, plants or animals
- Causing nuisance through noise or odours
- Adversely affecting the countryside or places of special interest

Operators carrying out waste activities under the terms of an exemption are required to register the activities with the Environment Agency (EA). There are two types of exemption; simple and complex, and the registration process differs accordingly. The complex exemption registration involves the submission of certain information regarding the activity and the payment of a fee. The details of the registration processes and the current fees can be found on the EA website. The exemptions relevant to the disposal of dredgings are discussed in section 2.5.

1.3.1 Low Risk Waste Regulation

The Environment Agency maintains a list of low risk waste activities; these activities are not exempt from environmental permitting but they do not justify enforcement. If an activity appears on the list, the EA take the view that it would not be in the public interest to require an environmental permit for the activity. The list is subject to change and the EA can revoke it in full, or part, at any time.

The list can be found at:

<http://www.environment-agency.gov.uk/subjects/waste/1416460/1334460/1098094/>

1.4 Landfill Directive

The Landfill Directive, implemented in England and Wales by the Landfill (England and Wales) Regulations 2002 (as amended), and recently retransposed by the Environmental Permitting (England and Wales) Regulations 2007 has led to significant changes in the way we dispose of wastes.

The requirements of the Landfill Directive have been progressively introduced since 2002. One of the consequences has been the reduction in the number of operational landfills; due to stringent technical and engineering requirements of the Landfill Directive. The main requirements of the Landfill Directive are:

- Landfills must be classified as hazardous, non hazardous or inert.
- Waste acceptance procedures have to be in place at the landfill.
- Waste must be pre-treated before being landfilled.
- Certain waste types cannot be landfilled e.g. liquid, certain tyres and some hazardous materials.
- Biodegradable municipal waste will be progressively diverted away from landfill.
- The waste producer is responsible for ensuring that basic characterisation of the waste has taken place to establish its key characteristics as specified in the Environmental Permitting Regulations. For example, details of the chemical composition and leaching behaviour of the waste are required.

1.4.1. Waste Acceptance Criteria

The Waste Acceptance Criteria (WAC) sets leaching and other limit values that components of the waste stream must meet in order to be landfilled. There are WAC for inert, for hazardous and for stable, non-reactive hazardous wastes. Each class of landfill may only accept wastes that meet the relevant waste acceptance criteria. There is no WAC, and therefore no leaching limit values for non-hazardous wastes destined for non-hazardous landfills.

Hazardous liquid waste has been banned from landfill since July 2004 and the ban was extended to non-hazardous liquids from 30 October 2007. Waste in liquid form is regarded as:

- i) Any waste that near instantaneously flows into an indentation void made in the surface of the waste; **or**

- ii) Any waste load containing free draining liquid substance in excess of 250 litres or 10% of the load volume, whichever represents the lesser amount. "Free draining" means a liquid as defined in (i), irrespective of whether that liquid is in a container.

The first of these interpretations can be used to distinguish between liquids and sludges. A waste that flows only slowly, rather than near instantaneously, into an indentation void will be sludge and therefore not prohibited.

The Landfill Directive requires that all waste destined for disposal at landfill must be subject to prior treatment unless it is inert waste for which treatment is not technically feasible.

Any treatment must fulfil the following criteria (but need only meet one of the four objectives of the third point):

1. It must be a physical/thermal/chemical or biological process (including sorting).
2. It must change the characteristics of the waste.
3. It must do so in order to:
 - a) reduce its volume, or
 - b) reduce its hazardous nature, or
 - c) facilitate its handling, or
 - d) enhance its recovery

The Landfill Directive excludes from its scope the deposit of non-hazardous dredgings alongside small waterways from which they are dredged. In the UK, it is accepted that all inland waterways are "small waterways". This has been transposed into domestic legislation using the wording from the Landfill Directive.

Dredging disposal sites falling within this exclusion will continue to be regulated by an environmental permit. Sites which fall outside the Landfill Directive exclusion will also require an environmental permit.

1.5 Landfill Tax

Landfill Tax is payable on waste that is disposed of at landfills; the Tax is regulated by HM Revenue and Customs and guidance on the application of the Tax is available on their website at:

http://customs.hmrc.gov.uk/channelsPortalWebApp/channelsPortalWebApp.portal?_nfpb=true&_pageLabel=pageExcise_ShowContent&id=HMCE_CL_001206&propertyType=document

Rates for 2008/09 are:

Active waste - £32/tonne (+VAT)
Inactive waste - £2.50/tonne (+VAT)

The rate for active waste increased by £8/tonne per annum from 1st April 2008 and this rate of annual increase is planned to continue until at least 1st April 2010 by which stage the tax will be £48 + VAT per tonne.

The rate for inactive increased to £2.50 + VAT per tonne on 1st April 2008. The Government has announced that the rate will be frozen at £2.50 + VAT per tonne in 2009/10.

Definition of Inactive and Active wastes

Inactive waste

Inactive waste is defined in the Landfill Tax (Qualifying Material) Order 1996 (extract below). The definition of 'inactive' waste has similarities but is not the same as the term 'inert' used in waste legislation.

Group	Description of material	Conditions
Group 1	Rocks and soils	Naturally occurring
Group 2	Ceramic or concrete materials	
Group 3	Minerals	Processed or prepared, not used
Group 4	Furnace slags	
Group 5	Ash	
Group 6	Low activity inorganic compounds	
Group 7	Calcium sulphate	Disposed of either at site not licensed to take putrescible waste or in containment cell which takes only calcium sulphate
Group 8	Calcium hydroxide and brine	Deposited in brine cavity
Group 9	Water	Containing other qualifying material in suspension

Notes on table:

- 1** Group 1 includes clay, sand, gravel, sandstone, limestone, crushed stone, china clay, construction stone, stone from the demolition of buildings or structures, slate, topsoil, peat, silt and dredgings.
- 2** Group 2 comprises only the following:
a) glass
b) ceramics
c) concrete
- 3** For the purposes of Note (2) above:
a) glass includes fritted enamel, but excludes glass fibre and glass-reinforced plastic
b) ceramics includes bricks, bricks and mortar, tiles, clay ware, pottery, china and refractories;
c) concrete includes reinforced concrete, concrete blocks, breeze blocks and aircrete blocks, but excludes concrete plant washings.
- 4** Group 3 comprises only the following:
a) moulding sands
b) clays
c) mineral absorbents
d) man-made mineral fibres
e) silica
f) mica
g) mineral abrasives
- 5** For the purposes of Note (4) above:
a) moulding sands excludes sands containing organic binders
b) clays includes moulding clays and clay absorbents, including Fuller's earth and bentonite
c) man-made mineral fibres includes glass fibres, but excludes glass-reinforced plastic and asbestos.
- 6** Group 4 includes:
a) vitrified wastes and residues from thermal processing of minerals where, in either case, the residue is both fused and insoluble;
b) slag from waste incineration.
- 7** Group 5:
a) comprises only bottom ash and fly ash from wood, coal or waste combustion; and
b) excludes fly ash from municipal, clinical and hazardous waste incinerators and sewage sludge incinerators.
- 8** Group 6 comprises only titanium dioxide, calcium carbonate, magnesium carbonate, magnesium oxide, magnesium hydroxide, iron oxide, ferric hydroxide, aluminium oxide, aluminium hydroxide and zirconium dioxide.
- 9** Group 7 includes gypsum and calcium sulphate based plasters, but excludes plasterboard.

Active Waste

Active waste is any waste that is not defined as inactive waste.

Dredged materials

Dredged materials are exempt from landfill tax if they comply with the guidance issued by Her Majesty’s Revenue and Customs (HMRC).

This includes dredged materials which have been treated (dewatered) by the addition of other materials (see guidance) to produce a waste that complies with the requirements of the Landfill Directive for disposal at landfill..

“Dewatering” is necessary in order to comply with the requirements of the Landfill Directive; in that it bans liquid waste from landfill)

The relevant sections from the guidance document LFT1 are:

4.1 Dredgings - material removed from water

4.1.1 Conditions
 Waste removed from inland waterways and harbours by dredging and disposed of to landfill is exempt from landfill tax.
 The circumstances under which dredging material qualifies for exemption are shown in the following table:

If ...	Then ...
material is removed from the bed of the water (including the banks of canals and rivers) and has been dredged from: <ul style="list-style-type: none"> • a river, canal, watercourse, dock or harbour; or • the approaches to a harbour and removed in the interests of navigation. 	it will qualify for the exemption.
sand, gravel or other materials are extracted from the seabed as part of a commercial operation	any naturally occurring substances which result from this operation that are disposed of to landfill will also qualify for the exemption.

Note: You do not need a certificate from us to qualify for this exemption but your records must show, through commercial documents, the source of the waste.

4.1.2 Definition of watercourse
 To qualify as a watercourse a body of water must demonstrate it has a:

- natural source of surface or underground water;
- flow, under the action of gravity;
- reasonably well defined channel of bed and banks; and
- confluence with another watercourse or tidal waters.

Update 2 issued December 2007

This update amends the notice by including the extension of the exemption for waste arising from dredging activities to cover waste that has been treated with additives so that it is no longer liquid waste and therefore complies with the requirements of the European Council Directive on the landfill of waste.

This extension came into effect on 30 October 2007 and ensures continuity of the benefit of exemption where other substances have been added to dredged waste in order to ensure compliance with the environmental ban on the landfill disposal of liquid waste.

4. Exemptions

4.1.1 Conditions

After ‘the source of the waste’ in the last line of the paragraph insert ‘and, where relevant, the nature and effect of the treatment it has undergone.’

New paragraph

4.1.3 Acceptable treatment

The extended exemption applies to disposals of waste all of which HM Revenue & Customs is satisfied comprise material removed from the bed of the water (including the banks) and other material which has been added to it in order to ensure that it is no longer liquid waste and therefore complies with the requirements of the European Council Directive on the landfill of waste. Liquid waste is:

(i) any waste that immediately flows into a space made in its surface; or

(ii) any waste load containing more than 250 litres of free draining liquid or 10% of the load volume, whichever is the lesser amount. ‘Free draining’ means a liquid as defined in (i), whether or not it is in a container.

This extension to the scope of the exemption does not absolve waste producers and landfill site operators from fulfilling their obligations incurred under waste management regulations and, if they have any doubts about those obligations, they should seek advice from:

Environment Agency (for England and Wales); Scottish Environment Protection Agency (for Scotland); or

Environment & Heritage Service (for Northern Ireland).

To qualify for exemption, the additive used must have dehydrating properties or bind the excess moisture content within the waste. In either case producing a material that is not liquid waste.

Additives such as sand and sawdust absorb liquid temporarily but release it again as waste is compressed within the landfill. Accordingly, these additives are not acceptable for the purposes of the exemption.

In addition to material that is normally regarded as dredgings, the exemption **may** (prior consultation with HMRC required) also apply to:

- Material excavated from in-filled channels, providing that there is continuity of water through the infill
- Material excavated as part of channel relining works
- Litter/rubbish removed from the waterway
- Certain works to reservoirs

As the guidance indicates, HMRC do not provide a certificate to confirm the exemption. To satisfy the requirements, it is necessary to state on the transfer note/consignment note that the waste consists of dredgings (the exemption does not apply to loads which are a mix of dredgings and other wastes).

Although not a legal requirement, some landfills have asked for additional information to confirm that the material is exempt. In these instances, it is appropriate to provide them with a letter confirming that the waste consists of dredgings, quoting the relevant exemption from the guidance document, LFT1 and attaching copies of any relevant correspondence.

The Environment Agency pro-forma associated with transfer notes may help in providing the necessary information requested by landfill operators, this can be found at:

http://www.environment-agency.gov.uk/commondata/acrobat/transfer_20044886.pdf

1.6. Food and Environment Protection Act

Under the Food and Environment Protection Act 1985 (FEPA), a licence is required for the disposal of waste at sea, primarily dredged material including its use for beneficial purposes. Under FEPA, the 'sea' includes any area that is submerged at mean high water spring tide.

The Marine and Fisheries Agency (MFA) issue the licences under FEPA for the disposal at sea of dredged material. Details of the licensing process can be found on the MFA website at:

<http://www.mfa.gov.uk/environment/guidance/guidance.htm>

The MFA will identify the nearest designated disposal site for the dredged material. If operators wish to nominate a new site the cost of the required investigations will be the responsibility of the operator and can be prohibitively costly and time consuming.

FEPA licences can only be issued for the disposal of dredgings from inland navigations when the dredging activity takes place within the tidal zone.

N.B. It is extremely unlikely that a FEPA licence would be issued for the disposal of dredgings from inland navigations when the dredging activity took place outside the tidal zone.

1.7 Nitrate Vulnerable Zones

The spreading of dredgings to agricultural land has been impacted by the implementation of the Nitrates Directive into UK law. BW in partnership with Defra and the EA funded a trial to look at the impact of the activity and to show the effects that spreading dredgings at a thickness greater than that allowed under the current NVZ Action Programme.

In reviewing the NVZ Action Programme, Defra have indicated that for spreading of dredged material to agricultural land within an NVZ (after the regulatory changes take place - expected in 2008), the Rules could be interpreted and implemented as follows:

- a) The **crop requirement limit** requires farmers to:
- i) plan their nitrogen fertiliser applications
 - ii) comply with a specified maximum application rate (Nmax)

i) **Planning fertiliser applications**

Farmers must plan their nitrogen fertiliser applications by:

- assessing soil nitrogen supply (SNS),
- assessing the nitrogen requirement of the crop (taking account of SNS),
- assessing the nitrogen supplied from organic manures, and then
- calculating the need for manufactured fertiliser by deducting contribution from organic manures from crop requirement

A possible interpretation of this rule is that the nitrogen supply from applications of dredgings should be assessed during the first step in the above planning process – ‘assessing soil nitrogen supply’. This is in recognition of the fact that:

- applications of dredgings to land do not represent a high risk of nitrate loss through leaching

- dredgings do not fall within the NVZ Regulations definitions for either organic manure or manufactured fertiliser but, rather, are predominantly a soil-type material.
- most of the mineral N in the dredgings is lost before a crop can be established, and therefore it would be inappropriate to require farmers to assume it is available for crop uptake during the planning process (which is what the current rules require).

This interpretation would mean:

- some form of soil analysis would be required to enable farmers in NVZs to take account of the mineral N supplied by the dredgings to the crop as part of their assessment of soil nitrogen supply.
- operators are likely to be able to spread larger quantities of dredgings to land than permitted under the current rules.

It is suggested that dredging operators provide farmers with assistance in making this assessment through undertaking soil analysis (at some point after dredgings are applied to land). Dredging operators would also be encouraged to collate the results of soil analysis and share the information with Defra.

ii. **Maximum application rates (Nmax)**

The average N application rate (from organic manure and manufactured fertiliser) made to a particular crop type across the farm must not exceed a specified maximum application rate for that crop type (N max).

As this rule only applies to organic manures and manufactured fertilisers, applications of dredgings do not need to be accounted for in the N max calculation.

b) A number of **other rules** restrict when and where nitrogen fertiliser (which includes dredgings) can be applied. These remain broadly unchanged from the current Action Programme and include:

- Applications of N fertiliser to land with a **steep slope** will be prohibited where, taking into account factors such as proximity to surface waters, ground cover etc. there is a significant risk of pollution via run-off.
- Do not apply N fertiliser when the soil is either **waterlogged, flooded, frozen hard or snow-covered**, or when **heavy rain** is predicted within 48 hours.
- N fertiliser must be applied in as **uniform and accurate manner** as possible.

Dredging operators normally conduct an environmental impact assessment before undertaking any dredging operations. This includes a consideration of whether soil conditions etc. are appropriate for making applications of dredgings. It is therefore highly likely that dredging operators comply with the above rules as a matter of course.

1.8 Town and Country Planning

Land spreading of dredgings is normally covered by GPDOs (Town & Country Planning, General Permitted Development Orders) and therefore does not normally require a formal planning consent.

There is an inconsistent approach to the planning requirements for permitted dredging disposal facilities; some are regulated by a planning consent and others under GPDO.

Planning consents, unlike GPDOs, have a limited life and they need to be renewed on a regular basis for the activity to remain compliant. A recent change to planning legislation now allows Planning Authorities to charge for visits to monitor planning consents.

The charge is in the form of a fee per visit; unless there are unusual circumstances, small dredging facilities should not require more than an annual visit.

1.9 Health and Safety

The works associated with dredging operations have the potential to put workers

Public Footpaths

Public footpaths may cross land where it is proposed to deposit dredged materials; the need for diversions/closures need to be discussed with the planning authority and other interested parties in advance of the works.

at risk if not managed properly. However, where the public cannot be totally excluded from the dredging operation the risk to them also needs to be considered and managed. It is the responsibility of the operator to ensure that both their own staff and any contractors used are complying with the relevant regulations.

The Control of Substances Hazardous to Health Regulations 2002 (COSHH) require employers to assess the risks associated with hazardous substances that employees are exposed to, implement any measures that need to be put in place to control the exposure and establish good working practices. Sypol carried out generic COSHH assessment for BW from various dredging samples taken in 1998, although these assessments have not been updated, due to the generic nature of the samples, they may still be valid as generic assessments.

When dredging contaminated sediments, more consideration will need to be given to COSHH assessments, as the nature of the work and method of disposal chosen could produce an increased risk. COSHH assessments need to be carried out on a site specific, project by project basis. To enable operators and contractors to establish the risks, samples need to be taken, allowing enough time for the information to be gathered and the risks assessed. Following the determination of the risk, controls would need to be put in place before works can commence. This would require a more substantial lead in than projects where the risks were low.

2. Disposal, use and recovery options

2.1. Introduction

The waste hierarchy is a guide for determining the Best Practicable Environmental Option (BPEO) for Waste Management. The Waste Hierarchy identifies waste management options and ranks them in order of increasing environmental impact. It prioritises the prevention and reduction of waste, then its reuse and recycling. The disposal of waste to landfill should be the last resort if none of the other options are appropriate. The hierarchy specifies the following order of preference for dealing with wastes:

1. Elimination - means not carrying out dredging activities or the use of hydrodynamic techniques and is the most cost-effective means of waste minimisation with the lowest environmental impact. Waste prevention should always be the first consideration.

2. Reduce i.e. amend the dredging specification to reduce depth or width, thus volume where the waste cannot be eliminated.

3. Re-use materials where possible to maximise their beneficial use, e.g. in construction, agriculture or habitat creation.

4. Recycle and compost; (for consideration) after exhausting steps 1 to 3, e.g. sort the waste into the various fractions.

5. Energy Recovery e.g. the process in which energy (in the form of heat) is recovered from the incineration of waste, and used to generate electricity which is then fed back into the national grid, or provide both electricity and heat (combined heat and power) to nearby communities or other uses.

6. Disposal of waste should only be considered as a last resort, when steps 1 to 5 have been exhausted. Disposal has the highest environmental impact.

The hierarchy is a guide. It does not mean that in all circumstances, at all times, a higher option will be better than a lower option.

In most cases a combination of options for managing the wastes will be needed. But the hierarchy provides a simple rule of thumb guide to the relative environmental benefits of different options.

2.2 Use of Sediments in Engineering Works

Bank re-instatement and protection works are regularly undertaken on inland waterways. Typically this involves the construction of some form of retaining structure, e.g. sheet piling within the confines of the channel to form a stable bank to the watercourse. Fabric membranes and faggots can be used in river restoration works to stabilise banks and create wetland shelves. Rather than importing material, sediments are excavated from within the channel to use as backfill and gravels and reeds may be translocated within a site for restoration purposes.

The sediments, and other materials used in these activities, are not a waste if they are being used in construction/engineering works and there is no intention to otherwise discard them.

Dredgings to be used as an engineering material must be analysed to ensure they are suitable for use, both chemically and physically.

In cases where dredgings require treatment before they are suitable for use they must be considered to be a waste when they are excavated therefore their re-use would need to be controlled through the waste regulatory regime.

In situations where discarded dredged materials are suitable for use, they would be considered to be a waste when they are excavated therefore their re-use would need to be controlled through the waste regulatory regime.

Developing Greenfield and Brownfield Sites

An Environment Agency document entitled “The Definition of Waste: Developing Greenfield and Brownfield sites”, <http://www.environment-agency.gov.uk/business/444304/502508/1357364/?version=1&lang=e> April 2006 provides guidance on the definition of waste. This guidance may apply to dredged materials (both uncontaminated and contaminated) in situations where waterways form part of a relevant development.

The guidance states that:

“Where uncontaminated materials produced on site during construction works (including excavated soils and materials resulting from demolition) are used on site... the Environment Agency would not generally regard them as being discarded, provided:

- i) they are suitable for that use and require no further treatment,
- ii) only the quantity necessary for the specified works is used (otherwise it becomes a disposal activity), and
- iii) their use is a not a mere possibility but a certainty.”

The Environment Agency has also reconsidered its position on the regulatory controls that apply to work on contaminated sites. Until recently the EA stated that contaminated soils would become waste when they are excavated. However, the guidance now states that “contaminated soils not requiring treatment or containment could be considered suitable for use in the same way as uncontaminated soils, provided that there is no risk of pollution of the environment.”

Operators would need to be satisfied that such works involving contaminated material can be carried out without the contaminants posing a risk to the environment.



Backfilled coir rolls - Trent and Mersey Canal



Installation of Nicospan - Staffs & Worcs Canal

2.3 Hydrodynamic Dredging

Hydrodynamic dredging is the re-distribution/relocation of sediments within the same, or hydraulically interconnected water bodies. The method is subject to a Memorandum of Understanding between BW and the Environment Agency, (“Memorandum of Understanding between the Environment Agency and British Waterways for the use of Hydrodynamic Dredging Techniques in Inland and Estuarine Waters in England and Wales”).

The methods used in the process vary and encompass sediment agitation, pumping, and physical/mechanical transfer. All the techniques included are all those that result in sediment being transferred from one location to another within the same water body channel without breaking the water surface, plus those where dredgings are temporarily removed then returned elsewhere in to the same waterbody.

The term "same water body" means a water body that is hydraulically interconnected, even though it may be separated by locks, weirs, or other structures.

There are two broad categories of techniques:

"In situ" techniques which involve agitation of sediment "in situ" so that it is carried downstream by the water flow, e.g.:

- a) water injection dredging
- b) harrowing, raking and ploughing
- c) use of grabs and backhoe to move sediment

"Downstream" techniques, where there is insufficient water flow at the location to allow "in-situ" techniques, but where sediment can be transferred and released back to the same water body at a different location further downstream where water currents are high enough for dispersal, e.g.:

- a) discharge from a split-hopper barge
- b) cutter-suction dredging where dredgings are sucked up and discharged downstream via a pipe or discharged from a split hopper barge.
- c) use of grabs and backhoe to move sediment

The Memorandum of Understanding normally only applies during the period 1 November – end February (but not exclusively) as the environmental impacts of the operation are likely to be significantly lower during this period. An environmental appraisal and outline method statement must be agreed with the Agency before the operation is carried out.

Economically, hydrodynamic dredging is the lower cost option and it reduces reliance on normal waste disposal routes and dependence on landfill. Transportation and fuel usage are also minimised.

2.4 Disposal at Sea

Disposal of sediments from inland waterways into the marine environment is an option but it is a limited option that only applies where:

1. The dredging activity takes place within the tidal zone and a FEPA (Food and Environmental Protection Act) Licence has been issued for the disposal of the dredgings.
2. It is a disposal activity for which the EA have issued a Discharge Consent under the Water Resources Act 1991 (as amended by the Environment Act 1995).

2.5 Waste Exemptions

A number of exemptions from environmental permitting are available for the recovery/reuse of dredged materials. The relevant exemptions are described below.

a) Paragraph 7 – Land Treatment

Paragraph 7 of Schedule 3 to the EPA 2007 exemptions relates to the treatment of land used for agriculture with specified wastes where such treatment results in benefit to agriculture or ecological improvement. Under this exemption dredging spoil, providing it does not contain any dangerous substances, can be used for the treatment of land used for agriculture.

For dredging spoil from inland waters, no more than 5000 tonnes of waste per hectare is used on land in any period of twelve months. The maximum area that can be treated under one exemption notification for Paragraph 7 is 50 hectares.

The notification process for this exemption requires a certificate to be submitted to the Environment Agency.

The certificate must be prepared by a person with the appropriate technical expertise to assess:

- the composition of the waste in terms of its benefit to agriculture
- the appropriate application rate to the land taking into account the waste characteristics and the soil characteristics
- the potential impact on human health or risk of pollution of the environment associated with the land treatment activity.

The operator needs to show that treatment of the land with the dredging waste will improve the land for growing crops or grazing or provide ecological improvement.

To justify to the EA that the spreading activity will result in agricultural benefit, it will require analysis of the likely contaminants in the dredgings and the nutrient status of both the dredgings and the land where it will be spread. The receiving site soil analysis must show that the soils are deficient in the nutrients or properties required by the proposed crop and the dredging waste analysis must show that the waste will provide the nutrients or improvement to the soil structure. The waste analysis must also indicate that there are no significant potentially harmful substances in the waste that would cause significant pollution to the environment.

The sensitivity of the area where the dredgings are to be spread must be taken into account and a pollution risk assessment must be provided. For instance if the land has been designated as a Nitrate Vulnerable Zone or an Environmentally Sensitive Site, this may restrict the quantities of waste that can be spread over and above the restrictions imposed by this exemption.

On many waterways this recovery route may not be an option due to either the lack of suitable agricultural land close by or because of elevated levels of contamination within the waste. There is a fee payable when notifying to register this exemption and the exemption has to be renewed annually.

The relevant notification form and guidance can be found at:

<http://www.environment-agency.gov.uk/subjects/waste/1416460/1334460/1416503/1097663/?lang=e>



Beneficially conditioning agricultural land - Grand Union Canal, Leicester Line

b) Paragraph 9 – Land Reclamation or Improvement

Dredging wastes can be deposited on land under paragraph 9 if it is spread for the purpose of reclamation, restoration or improvement of that land; where the activity results in benefit to agriculture or ecological improvement.

The exemption is not relevant for green field sites. The land must have been subject to a previous industrial or other man-made development.

To justify the use of this exemption for agricultural benefit, there must be an analysis of the likely contaminants in the dredgings and the nutrient status of both the dredgings and the land where it will be spread.

A certificate must be provided to the EA describing how the activity will result in benefit to agriculture or ecological improvement and which demonstrates that the activity will be carried out without harm to human health or the environment.

The certificate must be prepared by or based on advice from a person with appropriate technical expertise. This paragraph also requires the applicant to demonstrate that the waste is spread in accordance with any requirement in or under the Town and Country Planning Act 1990. Up to 20 000 cubic metres may be spread per hectare, but the waste cannot be spread more than two metres deep in any one place. You can store the waste securely at the site of spreading for up to six months.

There is a fee payable when registering this exemption and the exemption has to be renewed annually. The relevant notification form and guidance may be found at:

<http://www.environment-agency.gov.uk/subjects/waste/1416460/1334460/1416503/1097663/?lang=e>

c) Paragraph 19 - Use in Construction Works

To benefit from this exemption the waste must be used for 'relevant work'. Relevant work is "work for the construction, maintenance or improvement of a building, highway, railway, airport, dock or other transport facility; recreational facilities; or drainage. It does not include work that involves land reclamation."

However, under this exemption, dredging spoil is only deemed suitable for use in drainage works. In the Regulations, drainage is narrowly defined and means drainage carried out for the purposes of the Land Drainage Act 1991, the Water Resources Act 1991 or the Environment Act 1995.

Up to 50,000 tonnes of waste can be stored at any one time and in the case of waste which is not produced on the site, it is not stored there for longer than six months.

As with paragraph 9, the work has to be done in accordance with any requirement in or under the Town and Country Planning Act 1990.

The relevant notification form and guidance may be found at:

<http://www.environment-agency.gov.uk/subjects/waste/1416460/1334460/1416503/1097663/?lang=e>

d) Paragraph 25 - Disposal to Banks

The deposit of dredgings waste from inland waterways to bank is covered by the Paragraph 25 exemption. This exemption allows non hazardous waste from the dredging or clearing of plant matter from inland waterways to be deposited along the banks or towpath of the waterways.

Dredgings can be deposited on banks away from the actual dredge site (within a reasonable distance) as long as the deposit takes place on the banks of the same waterway where the dredging or clearing takes place.

The exemption limits the deposits to 50 tonnes per linear metre of bank or towpath per day and prevents the dredgings being disposed of in a lagoon or container.

The dredgings, including plant matter waste removed from the waterway, can be treated by screening and dewatering under the terms of this exemption.

To ensure that the dredged materials are suitable for deposit under the terms of the exemption, they must be sampled and analysed.

A notification form is available on the Environment Agency website for this "simple exemption". You may also register at the EA's National Customer Contact Centre on 08708 506 506.

There is no charge for registering this exemption. As with all registrations with the EA for simple exemptions, each organisation only needs to register once, regardless of the number of times they carry out the activity.

On many waterways, particularly urban ones, this disposal route is not an option due to either the lack of suitable bankside land or the levels of contamination within the dredgings.

The deposit of dredgings and plant clearance waste can take place along the bank or towpath of any other inland water provided that the deposit results in benefit to agriculture or ecological improvement. For agricultural benefit, this will require analysis of the likely contaminants in the dredgings and the nutrient status of both the dredgings and the land where it will be spread.

The sensitivity of the area must be taken into account, for instance is it situated in a nitrate vulnerable zone or in a source protection area; or does the site have an environmental designation such as SSSI, SPA, SAC or AoNB etc.

The relevant registration form and guidance may be found at:

<http://www.environment-agency.gov.uk/subjects/waste/1416460/1334460/1329426/?lang=e>

2.6 Permitted Disposal Sites

Non-hazardous dredgings can be deposited in contained, engineered sites constructed alongside the waterway from where they are dredged. These sites require an environmental permit under Regulation 13 of the Environmental Permitting (England and Wales) Regulations 2007.

Non-hazardous dredgings which are deposited in a site other than alongside the waterway from where they were dredged, or hazardous dredgings, can be deposited in contained, engineered sites, regardless of their location. These sites require an environmental permit under Section 5.2 of Schedule 1 to the Environmental Permitting (England and Wales) Regulations 2007.

NB: non-hazardous and hazardous dredgings cannot be deposited of in the same site.

2.7 Permitted Treatment/Transfer Sites

In addition to disposal sites it is possible to have permitted treatment or transfer sites where dredgings are stored and or treated before they are re-used or disposed of.

British Waterways holds a number of these permits which allow them to let dredgings dewater naturally before they are used in construction works or disposed of at landfill. To be effective, these sites need to be well placed so that they are easily accessible from both the waterway and adjacent highways.

2.8 Commercial Landfill

Organisations such as British Waterways have relied heavily on landfilling to dispose of dredgings. However, the implementation of the Landfill Directive has had an impact on the disposal of dredgings to commercial landfill.

The Landfill Directive requires that all waste disposed of at landfill has to be pre-treated; this requirement has now been fully transposed into UK law.

In many cases dredgings are considered to be a liquid waste and from 30 October 2007 liquid wastes were banned from landfill. Therefore, prior to landfilling dredged materials, it is necessary to undertake pre-treatment that satisfies the requirements of current guidance published by the EA/Defra e.g. they may have to be "de-watered".

Dredged material may be classified as a sludge and, although landfills can accept sludges, there may be instances where some sites refuse to accept them due to the operational difficulties associated of handling wet sludges.

The requirement to pre-treat all waste going to landfill is significant as costs will be incurred in treating waste to ensure compliance with the acceptance criteria. The treatment options for dredging waste that has to be landfilled have to be carefully considered; as does the issue of whether suitable treatments are available, reliable and economically and practically viable.

The characterisation requirements for dredgings destined for landfill is likely to lead to an increase in analytical testing. The additional analysis required to demonstrate that hazardous or inert waste meets the relevant WAC is costly; currently estimated at £150 per sample.

As the availability of landfill capacity declines, disposal costs will increase. Over 200 landfill sites that previously accepted hazardous waste have ceased to do so since 16 July 2004 and only a small number of commercial hazardous landfill sites remain in operation. The capacity of these sites is far below the present level of hazardous waste produced within the UK.

The reduction in the number of commercial landfills will increase transportation costs for dredging works when landfilling is the only option. Also there will be increased environmental damage due to increased emissions, traffic congestion, highway wear and tear.

Those responsible for dredging works should seek alternatives to landfill, such as minimisation at source, recycling, recovery, or other disposal routes.

3. Timing of dredging works

The majority of dredging of inland waterways is carried out during the winter months during planned stoppages. This is perceived as the most appropriate time to dredge as waterway usage decreases during the winter months and the impact on the environment is less.

With the move to contract dredging, all year cruising and changes to the legislation controlling the disposal of dredgings; this view is now being challenged.

The table below details the advantages and disadvantages of both summer and winter dredging activities:

	Summer Dredging	Winter Dredging
Advantages	<ul style="list-style-type: none"> • Customers like to see works to improve the waterway network; therefore well publicised dredging has significant PR benefit. • On wider river navigations, dredging should not impede the passage of boats through the works. • Fewer boats on moorings, leaving greater accessibility to dredge closer to the bank. • Dredged material driers quicker when deposited to bank and agricultural land. • Acceptable on urban or hard edged canals and rivers (particularly rivers) due to lower environmental risk. • A balanced dredging programme allows dredging contractors to schedule work, personnel, plant and equipment more efficiently. • Better weather conditions also create safer working with better light and dryness. • Summer river dredging also avoids periods of rivers running in flood. • Summer dredging does not clash with stoppage programmes. 	<ul style="list-style-type: none"> • Reduced boat movement reduces the exposure of customers to delays and visual degradation created by the works. • Reduced plant growth, animal, amphibian, fish and bird breeding activities. • Dissolved oxygen (DO) levels are higher at cooler water temperatures, therefore reducing the risk of fish kills. • Draw down of water levels in winter makes dredging easier.
Disadvantages	<ul style="list-style-type: none"> • Badly publicised and intensive dredging may cause disruption to customers. • Increased water temperatures coupled with increased suspended solids reduce DO levels and increase the risk of fish kills. Monitoring required. • Increased water temperatures and soluble nutrients may create ideal conditions for excessive algal growth. • Increased plant growth, animal, amphibian, fish and bird nesting activities. • Bad time to replant. • Greater possibility of spreading seeds from invasive plant species. • Restricted access due to agricultural use of adjacent land. 	<ul style="list-style-type: none"> • Dredging program clashes with stoppage program; possibility of overstretching resources. • Delay in dredging program due to adverse weather conditions. • Weather conditions increase the risk of accidents. • Dredgings harder to dry and less acceptable to landfill operators. • Rivers navigations may be in flood. • More boats on moorings, reduced access to dredge closer to the bank.

Summary

The table shows that there are benefits to moving to an all-year dredging programme, although there may be additional environmental impacts to consider and greater costs to bear in order to achieve it.

An all-year dredging program may reduce the cost to Contractors due to better utilisation of equipment, plant and staff. It would also enable contractors to retain expertise and better absorb the costs of delays incurred during the winter dredging program. In addition, by utilising longer daylight hours and better working conditions during the summer months, further efficiencies may be achievable.

The main disadvantage of summer dredging is the increased environmental risks posed by the activity in relation to water quality, increased plant growth and breeding/spawning season. However with good planning, consultation with relevant experts and continuous monitoring, these environmental risks are manageable and need not be prohibitive to summer dredging. However, because of the possible environmental risks, summer dredging should be approved on a case by case basis.

The disposal of wet dredgings, although still a problem, may become easier in the summer months as the material will dry out quicker.

In the short term, it is likely that the main dredging period will still be winter but there are changes that could be made to the process to make things easier and cheaper i.e., if some of the dredgings could be stored for reuse or disposal during the summer periods, it would help to reduce the disposal problem and may also reduce tipping costs.

4. Characterising dredgings

To allow safe and sustainable disposal of the dredged sediment materials, the materials should be sampled prior to dredging in order to characterise the sediments with a view to their future re-use or disposal (i.e. typically to bank side, agriculture or landfill). To develop a sampling strategy for the sediments, consideration must be given to:

- The size of the dredging job
- History of the length to be dredged e.g. previous sampling results, discharges etc
- Available disposal/deposit site
- The likely disposal route

The appropriate analysis suite must be designed to match the information required for the preferred disposal route and the results must be assessed against guidance.

Sampling and analysis is a complex subject area and the use of experts is essential in determining what is required on a project by project basis.

Generic procedures and analytical suites can be developed but in all cases their applicability needs to be assessed against project specific requirements, and changes made accordingly.

It is essential that the laboratories used hold the necessary accreditations for the analysis required.

Some analysis is specified in legislation e.g. that required for Waste Acceptance Criteria (WAC) - it should be noted that there is a significant level of confusion within consultancies and contractors over when this analysis is required.

WAC TESTING IS NOT REQUIRED UNLESS THE WASTE IS TO BE DISPOSED OF AT LANDFILL AND IT HAS BEEN CHARACTERISED AS EITHER INERT OR HAZARDOUS WASTE: WAC TESTING IS NOT REQUIRED FOR THE DISPOSAL OF NON-HAZARDOUS WASTE AT LANDFILL.

Operators must characterise dredgings to allow appropriate disposal/re-use/etc in connection with:

- large dredging projects for navigation and/or drainage
- dredging projects for environmental improvement – contaminant/nutrient removal
- spot dredging
- incidental sediment clearance associated with other engineering works

Unless operators have in-house expertise, it is likely that they will have to appoint specialist consultants/contractors to advise them on the sampling and analytical requirements, as well as interpreting the results and advising on suitable re-use/disposal routes (sometimes this responsibility is delegated to the dredging contractor – it will depend on the type of contract used).

BW has commissioned a report from a specialist consultant and, when finalised, this report will give guidance on the sampling, analysis and interpretation of the results of chemical analysis of sediments from BWs waterways.

It will also include a recommended testing specification for sediments to ensure appropriate data provision for categorisation of dredged materials as non-hazardous or hazardous materials is provided.

The report will give guidance with respect to assessment for disposal to bank side or landfill; it will not give guidance with respect to assessment for disposal to agricultural land.

5. Dredging and treatment methods

5.1 Hydrodynamic Dredging Techniques

Hydrodynamic dredging is subject to a Memorandum of Understanding between BW and the EA. Some of the techniques might be seen as unconventional for inland dredging but they are the norm in the marine environment where every effort is made to retain sediment in the system rather than remove it. The MoU requires a consultation process to be entered into in advance of any planned works. The outcome of the consultation process is by no means certain and even where works are approved, constraints may be placed upon the operation by the EA.

The MoU on Hydrodynamic dredging was developed in order to provide a process that can be followed in addressing concerns related to the techniques covered and to help in finding the most acceptable method(s) of maintaining the waterways.

5.1.1. Water Injection Dredging

Water Injection Dredging (WID) is a method of redistributing silt. The technique uses high pressure jets to inject water into the layer of silt on the bed of the waterway. This creates a mobile layer of silt on the bed which then disperses with the flow. The method is cost effective for moving large quantities of silt at relatively low cost. However, it is only suitable for use in certain circumstances; it will not move large debris, and can only be used where it is unlikely to create a problem with the silt re-depositing downstream of the works.

This technique has been successfully used by BW at Limehouse Basin, Gloucester Docks and on the River Severn at Gloucester.



Water injection dredger

5.1.2 Plough Dredging

This technique is known by several terms ploughing, bed levelling and harrowing. It involves the use of a tug boat pulling a heavy “plough” along the bed of a waterway causing silt to be moved from one area to another. It is generally used for small localised areas of siltation. The advantage of this method is that it creates no waste and is relatively inexpensive.

BW has used this technique regularly at, Hull Marina, London Docklands and at Sharpness, mainly at the approaches to lock entrances.

5.1.3 Weir Dumping

This is the process of dredging accumulations of sediments upstream of weirs on river navigations; the sediment tends to accumulate in the slack water at lock approaches and, if not moved on a regular basis, will prevent the use of the lock. A dredger/excavator will remove the accumulation and re-deposit into the river where the flow will take it over the weir; this may require the material to be placed into a hopper which is then unloading either immediately above, onto or below the weir and letting the material be taken away by the flow.

The use of weir dumping has raised some concerns in the past, related to:

- The deposit of controlled waste within a water body – technically an offence
- Water quality issues – dissolved oxygen and suspended solids
- Fauna and Flora – the potential of silt blanketing habitats

but as the activity is only re-introducing the sediments back into the river system from where they came; there should not be any significant issues (providing a commonsense approach is taken to the timing of the activity and the quantities re-introduced at any one time).

It is an activity that will take place naturally in times of flood.

5.2 Conventional Dredging Techniques

5.2.1. Raking

Raking can be used as a means of reducing both the volume of waste created and the level of contamination contained in the dredgings removed. The technique involves the use of an open-tined bucket on a conventional backhoe dredger.

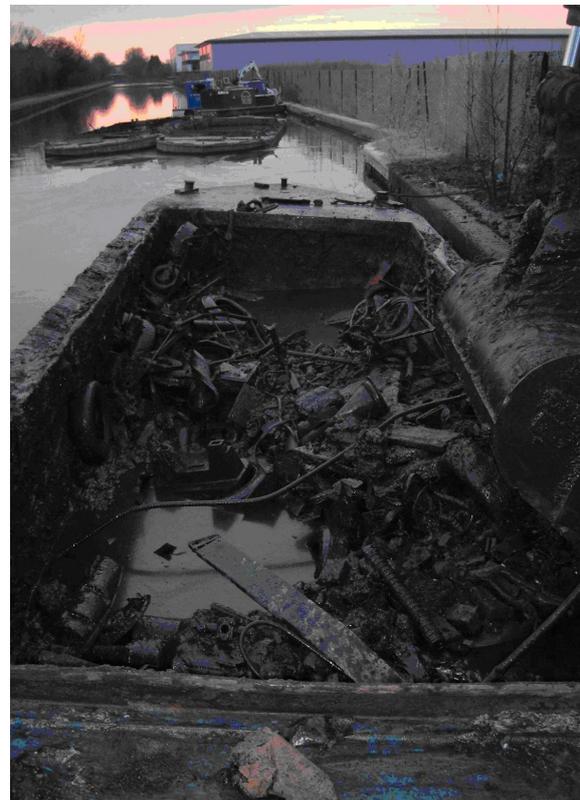
The advantage of this technique is that it enables the removal of the larger debris, typically greater than 50mm, (which inhibits the movement of boats) whilst leaving the finer organic silts which are mobile and create much less of an impedence to boat traffic. As the contaminants are generally attached to the finer fraction of the silts, the larger debris is relatively uncontaminated.

The removal of all the silt (particularly if it is classed as hazardous waste) would be significantly more cost prohibitive. The decontamination process can be taken a step further by washing the excavated material over a screen or in a skip of water.

The technique is especially suited to the clearance of bridge holes and urban areas where malicious “dumping” of waste takes place.



Raking bucket



Raked material - London bridge holes

5.2.2 Bucket Ladder Dredgers

Bucket ladder dredgers have been used on inland waterways, especially on the larger river navigations for many years. They can be highly productive pieces of equipment but tend to be costly to construct, maintain and operate.

5.2.3 Landbased Back-hoe/Grab Dredgers/ Dragline

This type of dredger comes in many shapes and sizes usually related to the size of the waterway to be dredged and the availability of access. As the technique involves tracking the excavator alongside the waterway as the dredging takes place, it is normally used in rural environments.



Narrow back-hoe dredger
Monmouthshire & Brecon Canal

5.2.4 Floating Back-hoe/Grab Dredgers

This type of dredger comes in many shapes and sizes and consists of a back hoe excavator mounted either temporary or permanently on a pontoon / hull. The hull or pontoon is usually fitted with adjustable “spud” legs that provide stability for the craft whilst it is dredging.



Wide beam (split pontoon) back-hoe dredger
Rufford Branch, Leeds & Liverpool Canal



Wide unfloat mounted back-hoe dredger - Sheffield & South Yorkshire Navigation

The traditional dredging technique used within the Broads for the last 40 years, grab dredging uses a clam shell bucket suspended from a crane jib and is usually operated by wires to dig material from the bed of the water body e.g. River Chet, shown below.



River Chet dredging, 2000

5.2.5 Cutter Suction Dredgers

There are several different types of cutter suction dredgers available but they are seldom used on inland waterways in the UK because they; cannot deal with dredgings that contain debris such as shopping trolleys, traffic cones and large pieces of masonry, and produce a very liquid discharge with low concentrations of solids. The technique would better suit large waterbodies such as reservoirs. Unless large areas of suitable land are available where the discharge can be spread and allowed to dry naturally, it will require the construction of large engineered lagoons to contain the discharge until it dries sufficiently for re-use or final disposal. Creating these lagoons is likely to need both a planning consent and an environmental permit.

Cutter suction dredging has been used successfully on a number of occasions:

- **Hull Marina**
It was possible to discharge the dredged material directly into the River Humber. This operation was regulated by a FEPA Licence.

- **Norfolk Broads**
Cutter suction dredging has been used within the Broads. It used an auger to disturb the sediments, which is then sucked into a pump and can be transported significant distances. This technique is most controllable, does not produce suspended solids at the point of use and provides a very smooth bed profile.



However, to transport the sediments high volumes of water are also taken up through the pump, with a low percentage of solids (usually 10%). The resultant material requires dewatering and probably requires construction of lagoons to manage the process. The excess water can be returned to the water body, but suspended solids need to be settled out first to ensure no local pollution at the discharge point. The material may take significant time to dry sufficiently to be re-handled and the area reinstated.

- **River Weaver**
Dredged material was discharged over a weir to the downstream pound using an informal agreement with the local EA officer.

Use of this technique is now being progressed with the MFA for a FEPA licence in regard of the tidal section of the Ribble Link.



Cutter suction dredger

5.3 Treatment Options

From October 2007, all dredged materials has to be pre-treated prior to disposal at landfill and the disposal of all liquid waste is banned at landfills.

Sites with Environmental Permits for the disposal of non-hazardous dredgings alongside small waterways will not be affected by the new rules.

In identifying possible treatment options it is first necessary to identify what the treatment is trying to achieve. Whilst this may simply be to achieve the most economical disposal of the waste there are other issues that could also drive the process. For example a higher level of treatment may result in a sustainable re-use for the material rather than disposal.

5.3.1 Removing Debris

5.3.1.1 Large Debris

The first stage of any treatment method is to remove the large debris e.g. shopping trolleys, tyres, motor bikes etc; this is usually done using the excavator bucket either at the point of removal or at the discharge point (but it can be removed by the use of a fixed screen). The debris is normally stockpiled/ stored on site for later removal.

5.3.1.2 Small Debris

Vibrating screens can then be used to remove smaller debris (the screen size is variable to meet differing requirements) such as bricks, cobbles, etc. The screened material can be stockpiled/stored pending its recovery/disposal. This material will be free draining and it can usually be disposed of to non-hazardous landfill without any further treatment. Occasionally it may be necessary to “wash” the material to make it more visually presentable to landfills. If a high percentage of stone / brick is present consideration can be given to crushing and grading it in order to produce a useable secondary aggregate.



Screened debris



Screening in progress
Kennet & Avon Canal

5.3.2 Particle Size Separation (Soil Washing)

This can be a useful exercise in that it separates the sands and gravels from the silt fraction. It is normal that the majority of contamination is associated with the smallest particles and by separating these out it will reduce the amount of contaminated material that needs to be disposed of. The process for undertaking this is multi stage:

- Removal of large debris down to 50 mm by vibrating screen.
- Star screen to separate gravels and coarse sand
- Addition of flocculants
- Hydrocyclone to separate the remaining sand
- Pressing of silt fraction to reduce water content (belt press / recess plate press
- Treatment and disposal of resultant water



Mobile treatment plant

5.3.3 Bioremediation

This process introduces micro-organisms to break down contaminants, this method of treatment is generally most effective in breaking down organic compounds. It is less effective in dealing with contamination due to the presence of metals. The process needs to be tailored to the particular contaminants and will require close management for it to be completed successfully.

In many cases, the material has to be spread thinly over an area whilst the treatment takes place and this can create requirements for:

- Provision of sufficient area to undertake the treatment
- Protection of the under lying ground/ groundwater from contamination

5.3.4 Stabilisation

This is achieved by adding materials to the dredgings in order to make them easier to handle and acceptable (to landfills) in terms of their liquidity. Depending on the additive used, it may also be possible to gain additional benefits as the process may “lock in” the contaminants so that they are less leachable. Typical materials which are added are cement, pfa, lime and bentonite.

Cement has an advantage in that it results in hydration which drives off some of the water content but the process requires that the mixed material has to be stored for a period of time to allow it to cure.

Bentonite produces an instant reaction thus enabling immediate transport but it does add to the bulk of the material.

The mixing of bentonite or cement is usually undertaken in the hoppers at the discharge point using a machine bucket. This can result in some issues regarding water quality as inevitably some overspill can occur.

There are some polymer based additives that have been developed for the same purpose but, as yet, their use in the treatment of dredged material in the UK is limited.



Mixing of bentonite

5.3.5 Channel Dewatering

This is a natural method of producing a drier material and therefore reduce the tonnage to be disposed of but there are some obvious disadvantages, these are:

- Dredging could not involve floating plant
- Users would be inconvenienced for a period
- Impact on fauna and flora

The process can be accelerated by scraping the sediment up the banks of the watercourse to enable the free water to drain more easily.

This method is often used for ponds, lakes, reservoirs, mill streams and small water courses, incorporating over-pumping where necessary but is clearly not practical for tidal water courses.

5.3.6 Bankside Dewatering

Dredged materials can be placed on the adjacent bank to dewater before being removed for re-use, recovery or disposal.

The dewatering process would rely on excess water draining back into the waterway, percolation and evaporation.

Future developments

6.1 Composting

Dredgings might be suitable for mixing with composted materials to create an enhanced product which could help to increase the opportunities for marketing the material. It is likely that the resulting material would have to meet a recognised standard. Heavily contaminated dredgings are unlikely to be suitable and the wet nature of the dredgings may create problems for anyone considering including dredgings in the composting process.

6.2 Redundant Drying Beds

Dis-used sewage works are likely to be ideal facilities for the temporary storage of dredged material in order to dewater it. Following dewatering, the material could either be landfilled without further treatment at a reduced tonnage or be subjected to further treatment for reuse.

6.3 Engineered Drying Beds

A confined area containing a bed of sand or other porous materials upon which sludge is placed; dewatering of the sludge takes place through drainage and evaporation. This option may involve considerable capital investment.

6.4 Soil Hubs/Hospitals

Various landfill operators are proposing to set up "Soil Hospitals" where wastes, including contaminated materials, from various sources can be brought together and mixed/remediated to produce a usable product, such as, a restoration material for mineral workings, coal tips, etc.

6.5 Geotextile Bags/Sausages

These products have been available for some time and used widely in the marine dredging environment. Interest is now growing in looking at how they can be used for dewatering dredgings from inland waterways.

They work on the principle that they are filled with dredged material and over a period of time allow the free water to drain through the walls of the container. There are perceived difficulties in using these products in that they are difficult to fill by normal dredging methods and measures may have to be put in place to deal with the water draining from them in order to prevent pollution of ground and surface waters (prior consultation with the EA is required); although in returning water to its source no new contamination should occur, and trials have found geotextiles effective in retaining the silt particles to which contaminants are usually bound.

APPENDICES

Appendix 1

Dredging process followed by the Environment Agency

Appendix 2

Maintenance dredging of major flood defence/navigation channels within the Middle Level catchment

Appendix 3

EA Planning process — restrictions to inland dredging

Appendix 4

Memorandum of Understanding between The Environment Agency and British Waterways

Appendix 5

General COSHH Assessment for dredging BW's Class A and B sediments

Appendix 1

Dredging process followed by the Environment Agency

(order may vary and iteration likely)

- Inspector, staff or landowner identifies need
 - SoN (statement of need proforma) completed and approved
 - Site checked by HRM (Heavy River Maintenance) staff, work justified, prioritised and included in budget
 - EP exemption, Form A omnibus financial approval and NEAS submission processed annually
 - OS plans obtained
 - Preliminary proposals drawn up
 - Internal consultation undertaken (may require site visits and river corridor survey)
 - External consultation with relevant parties and consents obtained
 - Silt samples collected and analysed
 - EM provide decision on disposal
 - Utility services details obtained
 - Survey data obtained or survey commissioned
 - Land ownership information obtained
 - Detailed proposals drawn up
 - Access discussed and agreed
 - Spec and drawings produced and passed to ODU with utility info and silt analyses
 - Site visited with ODU
 - Method statement produced and approved
 - Landfill arranged, if necessary
- Pre-contract site meeting held
 - Risk assessment produced and MS amended, if necessary
 - Works undertaken

Appendix 2

Maintenance Dredging of Major Flood Defence/Navigation Channels within the Middle Level Catchment (using land based excavators)/Maintenance Dredging of Internal Drainage Board Pumped/Gravity (Non-navigable) Land Drainage Systems

There are three main types of maintenance dredging work normally undertaken by a land based machine.

- (i) Desilting
- (ii) Weed removal
- (iii) Combination of (i) and (ii)

Timing

The timing of maintenance dredging works within the Internal Drainage Board (IDB) and major flood defence systems is largely dependant on access. The majority of the IDB channels cannot be accessed until the crops in the adjacent fields have been harvested. This will vary according to the crop i.e. Rape can be removed as early as July followed by wheat/barley which is normally harvested during August/September. Harvesting of root crops, such as potatoes and sugar beet, will normally commence in September and, in the case of sugar beet, can be as late as December/January. In general machine cleansing works are normally programmed to commence in the autumn and are carried on through into the winter months. Maintenance dredging carried out over this period fits well with the environmental impact on the watercourse as the effect on riparian wildlife is considerably reduced by dredging at this time of the year.

Maintenance Dredging of Major Flood Defence/Navigation Channels within the Middle Level Catchment (using land based excavators)

Main river flood defence systems normally comprise of a large channel water body with raised flood protection embankments on either side. Many of these channels also form part of the navigation system. Dredging operations that are normally carried out during the winter months have the following benefits:

- i. Dredging maintains the navigable depth of the watercourse.
- ii. Dredging maintains the designed depth of the flood defence channel.
- iii. Boat traffic is comparatively light and works can be programmed to coincide with planned winter navigation closures for structural and maintenance works at locks, weirs etc.
- iv. Submerged and emergent weed growth is almost nil, which along with cooler temperatures considerably reduces the risk of de-oxygenation.
- v. The effect on riparian wildlife is reduced.
- vi. Dredging provides material with which to raise or 'top up' the adjacent raised flood embankments. Dredged material needs considerable drying time before it can be used in bank raising. Although the wet material will not dry sufficiently to be handled over the winter period the fact that it has already been dredged and sited on the bank side will maximise drying time when dryer conditions prevail. This will result in the dredged material being able to be handled earlier, middle to late summer when ground conditions are also at the optimum for the work to be undertaken.

Note

Programming the maintenance dredging of the major watercourses for the winter does not preclude the need to maintain a clear watercourse during the summer period when the growth of aquatic vegetation is at its most prolific. Vegetative growth levels can be kept in check with the use of weed cutting and weed removal boats allied, where appropriate, with the use of selective herbicide treatments. Circumstances can, of course, arise where summer dredging works are required particularly if there is a potential risk of flooding.

Appendix 2 /continued

Maintenance Dredging of Internal Drainage Board Pumped/Gravity (Non-navigable) Land Drainage Systems

Internal Drainage Board watercourses are usually smaller channels. Dredging operations are normally carried out during the autumn/winter months and have the following benefits:

- i. Maintains the design depths of the watercourse.
- ii. Access to channel bank sides more readily available.
- iii. Dissolved oxygen (DO) levels are higher at cooler water temperatures thus reducing the risk of deoxygenisation.
- iv. The need to abstract water from the system for overhead irrigation of crops is no longer a requirement and therefore district drain water levels can be reduced by pumping to allow dredging operations to be carried out more precisely.
- v. The effect on riparian wildlife of the channel is considerably reduced.

Regular cleansing of the channel reduces the build up of silt and therefore the quantity of material deposited onto the bank side is reduced and more easily managed.

The use of selective herbicides can help control summer weed growth particularly in the smaller shallower watercourses thus reducing the risk of restrictive flows should heavy summer rainfall occur. As with major watercourses circumstances can, of course, arise where summer dredging works are required particularly if there is a potential risk of flooding.

Dredging Process

- i. Ascertain the need for dredging either visually in the case of smaller shallower watercourse or depth survey for the deeper wider watercourses.

Note: There are some Internal Drainage Boards who have a phased machine cleansing programme with set

'revisit' times determined by the established historical knowledge of the maintenance requirements of each reach. Return times can vary between 2 and 7 years.

- ii. Preparation of estimates for the cost and extent of works to be submitted for approval.
- iii. Formal notices of the works to the relevant adjacent occupiers indicating timing of the works and access required.

Note: When Internal Drainage Boards have planned phased machine programmes notices can be issued 12 months in advance of the works.

- iv. Register Exemptions (Current law requires an exemption to be registered. This is done in advance, annually where needed.)
- v. Paragraph 25 – Disposal to Banks
- vi. Silt samples collected and analysed.
- vii. Obtain details of utility services.
- vii. Arrange for Environmental Impact Assessment to be undertaken by qualified person.
Assessment results may require changes to dredging techniques (i.e. presence of Water Voles/Water Vole habitats).
- viii. Carry out risk assessments.
- ix. Method Statements prepared and approved.
- x. Undertake works.

Appendix 2 /continued

Internal Drainage Boards who have to carry out maintenance dredging based on a different criterion

Example:

Hundred Foot Washes

The Hundred Foot Washes Internal Drainage Board basically consists of an Environment Agency flood storage reservoir, used in the spring summer and autumn periods for grazing and haymaking. It is an SPA and Ramsor site.

The Board undertake annual cleansing of the main header ditch and lengths of feeder watercourses with land based machines between May and July, subject to weather conditions, and deposit the spoil arising on to the bankside land with the assent of Natural England. Access availability is particularly ground conditions and the recession of flood waters. Dredging is required in this Board to allow the internal ditch system to circulate water let in from the adjoining tidal river into the header ditch and from there into the other ditches to maintain water levels and the water table, appropriate for Board users and conservation purposes. This work cannot be postponed until July and surveys of nests and undertake to avoid breeding birds being affected.

Excavator Type (Land Based)

The type of machine to be used to carry out the works will be dependant upon the size of watercourse to be dredged. In respect of most Internal Drainage Board channels a land based hydraulic machine will be sufficient. Land based excavators are available in various reach lengths.

Maintenance dredging of major watercourses normally requires the use of a land based dragline type excavator. Other than specialised long reach hydraulic machines the dragline is the most suitable land based machine to carry out the works.

De-silting

The excavator is fitted with a conventional dredging bucket. Holes can be cut in the bucket to allow water to be drained back into the watercourse before the silt is deposited on the bank.

Weed Removal

The excavator is fitted with a weed rake 'bucket'. The weed rake allows the water to escape but traps the weed.

Appendix 3

EA Planning Process - Restrictions to Inland Dredging

Various restrictions affect river dredging operations which need to be taken into consideration when planning works.

1. Legally Protected Areas

- areas protected by statute include river banks (Environment Agency – 8m and 16m from top of bank for fluvial and tidal rivers respectively); SSSIs, RAMSAR and SPA sites (Natural England); Conservation Areas (Local Planning Authority) and National Parks (Park Authority)
- the requirements for each vary and the responsible authority should be consulted

2. Environmental Stewardship

- landowners and tenants contract with Defra to provide environmental enhancements some of which may affect rivers, lakes and wetland areas
- damage to land under stewardship may result in a breach of contract and loss of grant payment
- to prevent damage land owners and/or tenants should be consulted
- <http://www.defra.gov.uk/erdp/schemes>

3. Tree Preservation Orders

- it is an offence to damage trees subject to a TPO
- damage can be effected by felling, trimming, removing bark, cutting through roots or piling dredged material against trunks
- the local planning authority should be consulted if tree works are involved
- major tree works should be phased over a number of years to obviate extensive loss of habitat

4. Marginal Vegetation

- marginal vegetation should be retained
- where removal is extensive, the work should be phased to prevent wholesale loss of habitat

5. Bird Breeding

- it is an offence to disturb nesting birds or damage their eggs or nests
- nesting may take place in trees, vegetation, reeds and water margins or on banks and islands
- the bird breeding season generally runs from mid-March to mid-August, but the period can be influenced by the weather, climate change and local factors
- birds can nest more than once during a breeding season dredging works, including on or off-site disposal of dredged material, can take place during the breeding season provided a survey shows that breeding birds would be unaffected
- <http://www.defra.gov.uk/paw/publications/law/default.htm>

6. Protected Species

- a number of species or their habitats are legally protected, examples being water voles, badgers, great crested newts and bats
- surveys should be undertaken and advice sought to ensure any necessary precautions are taken

7. Fish Spawning

- certain fish and their habitats are legally protected
- advice should be sought and dredging works undertaken outside the spawning season which generally runs between November and January

Appendix 3/continued

8. Invertebrates and Fish

- invertebrates and fish can be adversely affected by removal from water and silt pollution
- every effort should be made to return molluscs, fish, eels etc to water and dredged material should be retained on the bank for at least 24 hours to allow invertebrates to return to water

9. Pollution

- measures should be taken to prevent silt disturbed by dredging from migrating downstream where it may reduce oxygen content, block fish gills or cover gravels, to the detriment of fish spawning and invertebrates
- precautions should be taken when operating and maintaining plant to prevent pollution by diesel fuel, oil or hydraulic fluid

10. Hazardous Materials

- samples of all dredged material should be chemically analysed to identify the presence of contamination
- material shown to be hazardous may require remediation prior to disposal at an appropriately licensed landfill
- special arrangements will be required where there is a risk of the presence of particular materials such as munitions, phosphor and asbestos

11. Non-Hazardous Materials

- material shown to be non-hazardous may require off-site disposal if soluble contaminants exceed prescribed thresholds relating to groundwater quality uncontaminated material can be spread along banks subject to a limit of 50

12. Controlled Weeds

- controlled weeds such as Giant Hogweed and Japanese Knotweed require special handling and disposal arrangements

13. Nitrate Vulnerable Zones

- in NVZs dredgings can only be spread along the banks of agricultural fields if the nitrate requirement of the grass or crop exceeds the combined nitrate content of the dredgings and any artificial or organic fertiliser applied.

14. Dewatering

- any lowering/raising of water levels or dewatering/rewatering should be carried out carefully to prevent silt pollution and damage to wildlife and boats

15. Archaeology

- the local planning authority should be consulted to ascertain whether precautions are needed to protect areas or artefacts of archaeological interest

16. Utility Services

- some utility services are protected by statutory exclusion zones and other requirements
- utility service providers and private land owners should be consulted in respect of public and private services and onsite location surveys undertaken where appropriate

Appendix 4: Memorandum of Understanding

MEMORANDUM OF UNDERSTANDING

between **THE ENVIRONMENT AGENCY** and **BRITISH WATERWAYS**

FOR THE USE OF HYDRODYNAMIC DREDGING TECHNIQUES IN INLAND AND ESTUARINE
WATERS IN ENGLAND AND WALES

CONTENTS

1. Introduction
2. Context
3. Scope
4. Seasonal application
5. Liaison over proposals to use hydrodynamic dredging techniques
6. Underpinning guidance
7. Escalation procedure
8. Joint review arrangements

1 INTRODUCTION

1.1 Purpose

The purpose of this Memorandum Of Understanding (MOU) is to ensure effective co-operation between British Waterways (BW) and the Environment Agency (Agency) in dealing with dredging operations involving the re-distribution/disposal of dredgings within controlled waters (hydrodynamic dredging).

The MOU (supported by underpinning guidance) forms the basis for local discussions on the application of the techniques at one specific location or at a series of locations along a river or canal stretch.

This MOU will apply to works carried out by BW but it is expected that the Agency will apply its contents where it is involved in similar operations.

The MOU (along with the underpinning guidance) provides a protocol for planning and undertaking dredging operations so that adverse environmental impact is minimised and the long term sustainability of the water system is not compromised and provides that the regulatory approach to the operations is clearly understood.

BW's main duty relevant to this activity is to maintain navigations and that of the Agency to protect the water environment where the normal permitting arrangements do not apply.

Both BW and the Agency have obligations under the Habitats Regulations 1994 and section 28 of the CROW Act 2000 in respect of furthering the conservation and enhancement of flora and fauna of special interest in sites designated as SACs and SPAs or notified as SSSIs. This obligation covers activities carried within or outside these designations which could adversely affect the special wildlife features.

This MOU in no way circumvents the Agency's regulatory and enforcement responsibilities.

1.2 Definitions

Hydrodynamic dredging This is a generic term covering the re-distribution/relocation of sediments within the same, or hydraulically interconnected water bodies. The methods used in the process vary and encompass sediment agitation, pumping, and physical/mechanical transfer. A summary list of the techniques is shown in para 3.2

Appendix 4 /continued

1.3 Authority

This MOU stems from the Collaboration Agreement between the Agency and BW which was signed by both Chief Executives in June 2000 and also reflects the additional commitment to closer collaboration made at the joint Agency/BW conference in April 2002. The aim of the Collaboration Agreement is to focus on the common interests of the two organisations in the management and development of navigable rivers and canals. Dredging and dredging disposal was identified in the Annex to the Agreement, as one of the areas for potential collaboration. The MOU for hydrodynamic dredging is intended to meet the objectives within the Collaboration Agreement, in terms of sustainable development and improving efficiency by sharing and improving best practice.

2. CONTEXT

2.1 Need to Dredge

Navigation and environmental reasons.

Normally BW dredges to enable navigation; this is a statutory duty for BW but there are also environmental benefits to dredging e.g.

- Some waterways (e.g. canals) are artificially created and without dredging would return to dry land.
- It improves the waterway habitat by increasing clearance under boat hulls and so reduces silt disturbance.
- Removing historic legacies of contamination.

2.2 Disposal of dredgings

There are various options available:

- Recycling/reuse
- Disposal to bank
- Landspreading
- Disposal to landfill
- Dispersal in watercourse after hydrodynamic dredging (currently accounts for approx. 5% of BW's dredgings)

2.3 Key drivers for use of Hydrodynamic Dredging

Economic

Hydrodynamic dredging is the lower cost option, which a public body must always pursue if acceptable

Sustainability

- Reducing reliance on normal waste disposal routes and dependence on landfill;
- Minimising transportation and fuel usage

Appendix 4/continued

3. SCOPE

3.1 Geographical

This arrangement only covers England and Wales.

3.2 Techniques included

Dredging techniques included are all those that result in sediment being transferred from one location to another within the same water body channel without breaking the water surface, plus those where dredgings are temporarily removed then returned to the same waterbody elsewhere. The term "same water body" means a water body that is hydraulically interconnected, even though it may be separated by locks, weirs, or other structures e.g. canal to river; canal/dock to river; canal to lake and freshwater body to estuarine

There are two broad categories of techniques:

"In situ" techniques which involve agitation of sediment "in situ" so that it is carried downstream by the water flow, e.g.:

- a) water injection dredging
- b) harrowing, raking and ploughing
- c) use of grabs and backhoe to move sediment

"Downstream" techniques, where there is insufficient water flow at the location to allow "in-situ" techniques, but where sediment can be transferred and released back to the same water body at a different location further downstream where water currents are high enough for dispersal, e.g.:

- a) discharge from a split-hopper barge
- b) cutter-suction dredging where dredgings are sucked up and discharged downstream via a pipe or discharged from a split hopper barge.
- c) use of grabs and backhoe to move sediment

Underpinning guidance will be provided but a fuller description can be found in the CIRIA publication "Inland dredging techniques and operations - guidance on good practice", December 1996.

3.3 Techniques not included

- Any technique involving removal to or disposal of sediment onto land.
- Any hydrodynamic technique requiring permits from the Agency.

4. SEASONAL APPLICATION

1 November – 29 February

This MOU normally only applies during this period as the environmental impacts of hydrodynamic dredging operations are likely to be significantly lower during this period. This is because:

- migratory fish are unlikely to be passing
- water temperatures are lower (therefore less likelihood of deoxygenation)
- river flows are usually higher (therefore more dilution available for sediment).

Appendix 4/continued

Exceptions

When a waterway has been affected by a flood and dredging is required. In an emergency situation – see Section 5.

Where the environmental appraisal identifies issues that result in agreement that a different timeframe is appropriate.

5. LIAISON PROCEDURE

Both parties recognise that liaison at local level on individual projects is crucial. The purpose of the liaison is to:

- Confirm that a permit from the Agency is not needed. (If a permit is required, statutory timescales will apply)
- Collect relevant information for environmental appraisal and method statement

The general principle will be that BW will consult the Agency well in advance and the Agency will respond promptly with provision of sufficient relevant information and comments.

There may be some emergency situations where in-channel techniques need to be deployed rapidly e.g., immediate threat of flooding, serious damage to property, plant or equipment, or harm to human life. In these cases it is accepted that it may not be possible to fully follow these general working arrangements. However, BW will endeavour to minimise any environmental impact and inform the Agency as soon as possible.

Repeat operations, using the same technique, at the same location, under the same conditions and at the same time of year, will be subject to a simplified arrangement, but BW will inform Agency in advance so that they are aware, and can raise new issues that may not have been considered in the initial environmental appraisal.

The following stages 5.1 to 5.6 are recognised as being essential in the consultation process, and are summarised in Table 1 below for initial agreements and simplified in Table 2 for repeat operations. The timescales will be achieved on a best endeavours basis but may need extending in more complex situations.

5.1 Prenotification

BW will present an outline proposal to Agency at least **13 weeks** before intended start date.

5.2 Agency prenotification response

Agency will respond within **2 weeks** of receipt on the following points:

- Confirm (or otherwise) that a permit from the Agency is not required
- Identify issues of concern
- Identify sources of relevant information held by the Agency and others.

Appendix 4/continued

5.3 Environmental appraisal and method statement

BW will carry out an environmental appraisal (as opposed to an EIA under the EIA Directive and UK Regulations) in line with its Environmental Code of Practice. The appraisal will include:

- A statement explaining why “do nothing” and conventional dredging options were rejected
- The anticipated impacts and how they could be addressed
- Any opportunities for enhancement and how they can be realised.

Detailed underpinning guidance on the technical content of the appraisals will be produced to support the principles outlined here.

BW will also produce an outline method statement stating how the dredging operation is intended to be carried out. The statement will include an explanation of how the environmental impacts identified in the environmental appraisal will be addressed.

The environmental appraisal and outline method statement will be sent to the Agency for comment at least **8 weeks** before the planned start date.

5.4 Agency environmental appraisal and method statement response

The Agency will comment on the environmental appraisal and outline method statement within 2 weeks of receipt. Remaining concerns will be identified, distinguishing between legal and non-legal requirements.

5.5 Final submission

BW will amend its environmental appraisal and method statement if necessary, taking into account Agency comments, and resubmit them to Agency at least 4 weeks before the start date.

5.6 Agency response re Final submission

The Agency will send a response to BW at least two weeks before the start date, stating the circumstances in which they are in agreement with the operation proceeding.

Table 1. Summary of liaison process for initial approval

Step	By Whom	When (weeks before start)*
1. Prenotification	BW	13
2. Agency response	Agency	11
3. Environmental appraisal and method statement	BW	8
4. Agency response	Agency	6
5. Final submission	BW	4
6. Final response	Agency	2

Where it is necessary to consult others e.g. to undertake an appropriate assessment for the Habitats Directive, then longer timescales may be required.

*

Appendix 4/continued

5.7 Repeat operations

If the same technique is required at the same location, under the same conditions and at the same time of year, then the liaison process is as shown in Table 2. Repeating Stages 3 –6 in Table 1.

5.8 Status of Local Agreements reached before approval of this MOU

If the operation is a repeat of an operation first carried out before this MoU came into effect, then both parties will bring them in line with this MOU within a timescale that reflects the scale of the impacts and the sensitivity of the site. The works for Limehouse Basin already in the planning stage are likely to occur after this MOU comes into effect and are not covered by this MOU until the works are repeated.

Table 2. Summary of liaison process for REPEAT ACTIVITIES

Step	By Whom	When (weeks before start)
1. Prenotification with previously approved environmental appraisal and method statement	BW	8
2. Agency response asking either for changes to be made or to give approval.	Agency	6
3. Final submission if changes required.	BW	4
4. Final Response	Agency	2

6 UNDERPINNING GUIDANCE

6.1 Purpose

The Agency and BW will jointly develop underpinning guidance to support the liaison procedure in 5. Guidance will be provided to cover Agency/BW responsibilities and duties, contact details, operating boundaries, hydrodynamic dredging techniques and the details of the liaison process for both initial approvals and repeat operations.

6.2 Authority

Such underpinning guidance does not form part of the MOU. As a result, the guidance can be agreed and jointly reviewed by BW/Agency national leads when considered necessary and without any associated amendment to this MOU.

7 ESCALATION PROCEDURE

7.1 Purpose

In the event of parties failing to reach agreement relating to specific proposals, a mechanism is necessary to agree a way forward.

Appendix 4/continued

7.2 Procedure

Special meetings may be called by either party to resolve any immediate operational difficulties relating to a dredging proposal. Area Manager/Waterway Manager, from a different area/waterway independent from the original discussions, will take advice from national technical leads and review the proposals and relative positions and agree a way forward. This meeting will take place within 2 weeks of the initial request for a meeting and the outcome will be communicated to all interested parties by a joint written communication from those involved.

8. JOINT REVIEW ARRANGEMENTS

The Agency and BW national leads will meet at least annually to review the working of this MOU and recommend any necessary changes. The chair will be taken alternately by the two parties to this MOU, and representatives from other organisations (e.g. Nature Conservation Agencies) will be invited as necessary.

This MOU is not intended by either party to be legally binding and some or all of the arrangements or procedures referred to herein may be terminated by either party though they will use their best endeavours to give reasonable notice to the other party of such termination.

Signed for
British Waterways

Signed for the
Environment Agency

.....

.....

Stewart Sim
Director of Operations, British Waterways

Barbara Young
Chief Executive of the Environment Agency

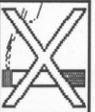
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Date.....

Appendix 5

A/207/0492 /132		British Waterways ESS COSHH Assessment Sheet		80597
Mat/Trade: GENERIC- DREDGING		Keyword : Specialist		
Company : *		Date : 31/03/1998		
Address :		Contents Standard bucket dredging of CLASS A & B material. No specific hazard known		
This assessment was compiled by Sypol Environmental Management, from supplier's data. Safety in the use of any assessments is the responsibility of the user.				
Hazard	 BIO HAZARD			
Considerations	 TRAINING			
	Ensure training of workforce for risks of leptospirosis infection. Staff to carry Leptospirosis card			
Health Risks	Exposure Limit : Not assigned EXPOSURE TO PATHOGENS MAY CAUSE HUMAN DISEASE RISK OF EXPOSURE TO HIDDEN SHARPS AVOID CONTACT WITH BROKEN SKIN IF FEELING UNWELL, CONSULT G.P AND SHOW ASSESSMENT WHERE POSSIBLE Avoid contact with skin and eyes Wear suitable protective clothing and gloves			
Spillage	WEAR RUBBER GLOVES WEAR EYE GOGGLES (CHEMICAL GRADE) WEAR PROTECTIVE OVERALLS & FOOTWEAR COLLECT INTO A CONTAINER, CLOSE LID DISPOSE OF IN ACCORDANCE WITH THE ENVIRONMENTAL PROTECTION ACT			
First Aid	INGESTION - DO NOT INDUCE VOMITING AFTER A SIGNIFICANT EXPOSURE CALL FOR MEDICAL ASSISTANCE IMMEDIATELY EYE - IRRIGATE WITH WATER FOR AT LEAST 15 MINUTES SKIN - WASH WITH SOAP/CLEANSER AND RINSE WITH PLENTY OF WATER WASH ALL CUTS AND ABRASIONS THOROUGHLY WITH CLEAN WATER COVER ALL CUTS AND BROKEN SKIN WITH WATERPROOF PLASTER IMMEDIATELY IF FEELING UNWELL CONSULT YOUR DOCTOR IMMEDIATELY			
Fire	NOT APPLICABLE			
Contract	Signed	Date		

Appendix 5/continued

A/207/0492 /132	British Waterways ESS COSHH Assessment Sheet	80597			
Mat/Trade: GENERIC- DREDGING Company : * Address :		Keyword : Specialist Date : 31/03/1998 Contents Standard bucket dredging of CLASS A & B material. No specific hazard known			
Activity: 1 Method: Direct Exposure Area: Outside Exp Time: All day Direct exposure to dredged material. Assessment does not cover disposal activity.					
 COVER SKIN	 PROTECT HANDS	 EYE GOGGLES	 NO SMOKING	 HYGIENE	 CHANGING
	RUBBER	IF SPLASH LIKELY	EATING OR DRINKING	WASH AFTER CONTACT	IF SOILED
 DISPOSAL					
SEE SPILL SECTION					
Activity: 2 Method: General Exposure Area: Outside Exp Time: All day Exposure to dredging process where minimal contact is envisaged. Assessment does not cover disposal activity.					
 COVER SKIN	 PROTECT HANDS	 EYE GOGGLES	 NO SMOKING	 HYGIENE	 CHANGING
	RUBBER	IF SPLASH LIKELY	EATING OR DRINKING	WASH AFTER CONTACT	IF SOILED
 DISPOSAL					
SEE SPILL SECTION					

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