ESA 5 - WORKS AND MAINTENANCE IN OR NEAR WATER

This advice is provided and maintained by the BSIF and is intended for guidance only. The information is provided in good faith, based upon the best information available at the time of writing and is to be relied on at the user's own risk.

Please remember that you have the responsibility to stay up to date with compliance matters and we recommend that you regularly check and review that what you do is in compliance with current legislation. Following good environmental practice will significantly reduce the chances of you causing an environmental incident, which you could be prosecuted for; and/or incur the costs of clean up etc.

Companies who are found to be responsible for a pollution incident may be subject to prosecution if they have not followed best environmental practice; and to the costs of clean up and civil undertakings (e.g. restocking fish).

Following this advice will help you manage your environmental responsibilities, prevent pollution and comply with the law. BSIF provide a series of Environmental Safeguarding Advice documents which we believe you will find useful. These can be downloaded at www.bsif.co.uk/resources

The advice given is based on available information and legislation and its' interpretation by BSIF. BSIF will not accept any direct or indirect liability deriving from following advice or guidance. For access/guidance on the steps you must take as a business to comply with the law by not causing pollution visit www.gov.uk or if your business in based in Scotland or Northern Ireland visit www.netregs.org.uk

The content of this Environmental Safeguarding Advice is recognised by the Environment Agency.

1. INTRODUCTION

1.1 LEGAL REQUIREMENTS

Your construction and maintenance activities in or near water have the potential to cause serious pollution or impact on the bed and banks of a watercourse and on the quality and quantity of the water. Dependant on which country you are operating in some activities with the potential for affecting watercourses or groundwater may require either consent or authorisation, it is important that you comply with the law as it relates to where you are operating. You should contact the appropriate agency (Environment Agency, Scottish Environment Protection Agency, Natural Resources Wales or Northern Ireland Environment Agency) for advice.

Types of activity that may impact upon the bed and banks of a watercourse or of a wetland include:

- Repairs, maintenance or improvements to any structure in, over or above the main river.
- Erection or construction of any structure, either permanent or temporary, in, over or above the main river.
- Diversion of flows.
- Works within the river channel or a lake/loch
- Works within the vicinity of a river, or loch or wetland (in Scotland)
- Any works likely to increase the risk of flooding
- Works within 10.0metres of a Main River watercourse or flood defence (in England, Northern Ireland and Wales).

There may be local variations in this distance, please contact your local regulator to confirm this.

Types of activity that have the potential to cause pollution of groundwater include:

- use of potentially polluting substances near groundwater abstraction boreholes (within Source Protection Zones in England and Wales, and within 50 metres in Scotland)
- use of potentially polluting substances near wells and springs
- use of potentially polluting substances in areas where groundwater is vulnerable, eg high groundwater table and thin covering soil
- sub-water table construction using materials containing potential pollutants (in Scotland)

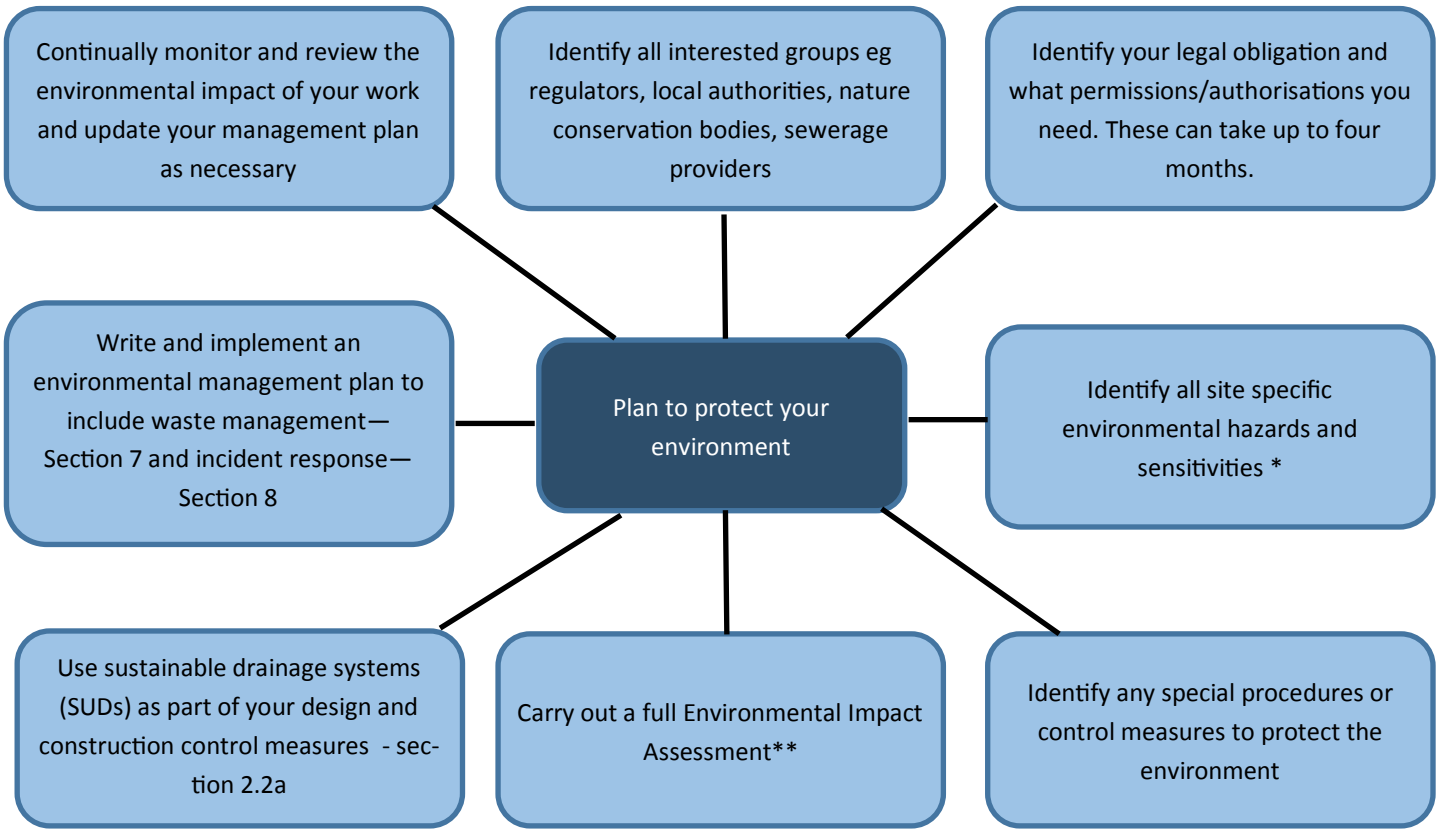
Types of activity that may remove water from sensitive parts of the water environment or affect other water users include:

- dewatering of excavations, particularly abstraction of large amounts of groundwater
- activities that dry up a section of a river due to coffer dams and over pumping

You should contact your local regulator early on in your project as the time-scale for obtaining consent or authorisation for these activities can take up to four months from receipt of the application.

1.2 PLANNING

Most pollution incidents are avoidable. With careful planning you can reduce the risk of your work causing pollution. Most of the measures needed to prevent pollution cost very little, especially if they are included at the planning stage of any scheme or project. We suggest the following framework for managing environmental hazards on your site; some of the items may be legal requirements.



* Some examples of site specific environmental hazards and sensitivities:
- oil or chemical pipelines
- mains water supply pipelines
- high voltage fluid filled cables
- downstream abstractors
- high amenity areas

- fish farms
- sensitive habitats eg wetland

** Environmental impact assessments may be a legal requirement of your project as part of the planning process. You should contact your Local Authority planning department for advice on this part of your project.

You can get information on local surface and groundwater water sensitivity from your local regulator before you start any work. In addition to preventing pollution of surface waters and groundwaters you should take precautions to prevent blocking of channels and culverts, and erosion of the riverbank or bed. This information should form part of the environmental impact assessment and site management plan.

1.3 POLLUTION PREVENTION

If you cause pollution you will be responsible for the cost of the clean up. This can be expensive particularly if groundwater has become contaminated. There may be additional costs associated with incident response and/or fines through the criminal courts
or civil claims.
Following this advice will help you reduce the likelihood of an incident. If one does occur contact the local regulator immediately. A rapid response to incidents will help to minimise the environmental impact and could reduce your overall costs—see section 8.

Potential pollutants from your type of works could include:
- silt - section 2
- cement and concrete - section 3
- chemicals and solvents -section 4
- bridge cleaning debris - section 5
- herbicides - section 6
- waste materials (including hazardous waste or special waste in Scotland) - section 7

Our Environmental Safeguard Advice 5 - Working At Construction or Demolition Sites has guidance, specific for the Construction sector, on environmental regulations and good practice. You should check this advice to find the information that applies to your project.

2. SILT

Silt pollution is a major cause of environmental incidents. It can damage and kill aquatic life by smothering and suffocating and can cause flooding by blocking culverts and channels.

2.1 ACTIVITIES THAT CAN CAUSE SILT POLLUTION

If you can prevent water becoming contaminated in the first place, then it reduces the risk of pollution and the overall cost of your control measures. To avoid silt pollution you should, wherever possible, use methods of work that reduce or eliminate working in the channel and that don't contaminate surface water.

2.1A DISTURBANCE OF THE RIVER BED / WORKING IN THE RIVER CHANNEL

When you have considered all other options and working in the channel is still necessary, such as in dredging operations, contact the local regulator as early as possible in your planning stages to discuss appropriate pollution control measures. Permission for this type of work may take up to four months to obtain. The risk of silt pollution causing an incident will depend on many factors including :

• likelihood of silt being disturbed
• what the river bed is made of, eg silt or gravel
• the conditions in which the work is carried out, eg hot weather and low flows

Silt pollution caused by working in surface waters can be minimised or prevented by keeping water out of the works area using appropriate isolation techniques, such as coffer dams and by-pass channels.

2.1B DISPOSAL OF WATER FROM EXCAVATIONS, DEWATERING AND PUMPING

Problems with disposal of water from the above activities may be minimised or avoided by:
• preventing water from entering excavations, by using cut off ditches
• considering the impact on groundwater if you use well point dewatering or cut off walls
• using pump sumps in excavations
• supporting inlet hoses above the bed
• discharging on to hard surfaces (concrete slabs/gravel) in to surface waters
• use of appropriate pump rates – to avoid disturbance of bed or bank the maximum rate should be set after consideration of the flow of the river, the location of the discharge and the risk of erosion
• protection of the pump inlet to avoid drawing in aquatic life and other debris
• minimising disturbance of standing water

2.1C EXPOSED GROUND AND STOCKPILES

Soil stripping and vegetation removal at the start of a project can increase the volume of contaminated surface water run-off. It can also reduce the area of vegetated land available for disposal of silty water.
You should:
• minimise the amount of exposed ground and soil stockpiles from which the water drains and the period of time such water drains – this is also a legal requirement in Scotland
• only remove vegetation from the area that needs to be exposed in the near future
• seed or cover stockpiles
• use silt fences at the toe of the slope, made from geotextiles, to reduce silt transport
• collect run-off in lagoons and allow suspended solids to settle before disposal

2.1D ON-SITE WORKING

The movement and maintenance of plant on site can generate silt and oil contaminated water. Sources of silt such as plant and wheel washing and site roads and river crossings carry a high risk of causing pollution.

PLANT AND WHEEL WASHING

To reduce the pollution risk make sure that:
• plant and wheel washing is carried out in a designated area of hard standing at least 10 metres from any watercourse or surface water drain
• run-off is collected in a sump - recycle and reuse water where possible
• settled solids are removed regularly
• discharge of contained water goes to foul sewer (if possible) with prior permission from your local sewerage provider – section 2.2e - or
• tanker off site for authorised disposal – section 2.2f

SITE ROADS AND RIVER CROSSINGS

Run off from site roads and river crossings can contain high levels of silt. Reduce the pollution risk by:

- brushing or scraping roads to reduce dust and mud deposits
- putting small dams in artificial roadside ditches to retain silt
- using existing permanent bridges or pipe crossings for river crossing
- if necessary building temporary bridges - but not fording rivers
- working from the bank where possible – not in the river

2.2 DISPOSAL OF CONTAMINATED WATER—TREATMENT AND DISPOSAL METHODS

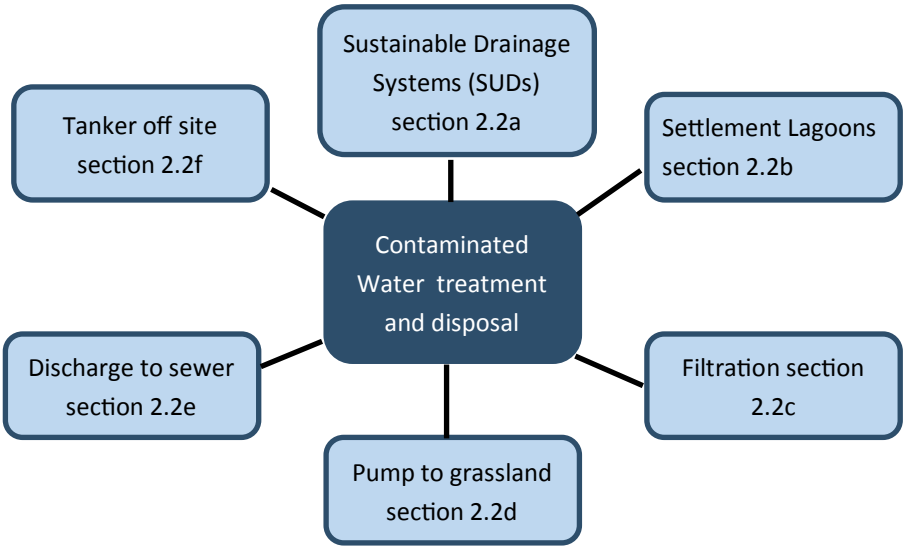
Where runoff water is contaminated with silt or other pollutants such as oil this water must not be pumped or allowed to flow directly or indirectly into surface waters or groundwater without treatment.

If a discharge to surface waters, groundwater, soakaways or surface water sewers is necessary it may require consent or authorisation from the local regulator. Contact them early in the planning stage of your project as a consent or authorisation could take up to four months to issue. If they issue a consent or authorisation it will limit volume, amount of silt and the presence of any oil in the discharge, and may have conditions for additional substances.

The choice of method for the treatment and disposal of contaminated water will depend on:

- the volume of water
- the area of land available for storage, treatment or discharge
- the amount and type of silt
- the presence of other substances in the water
- the conditions of any consent or authorisation

Treatment and disposal methods include:



2.2A SUSTAINABLE DRAINAGE SYSTEMS (SUDS)

Sustainable drainage is the practice of controlling surface water runoff as close to its origin as possible by slowing flows, allowing adequate settlement and biological action to take place before water is discharged to a watercourse or to ground. It uses softer engineering solutions to imitate natural drainage rather than traditional piped drainage solutions. Sustainable drainage methods used both in the construction phase and in the design of the project will:

- reduce flood risk from development within a river catchment
- minimise diffuse pollution arising from surface water runoff
- minimise the risk of pollution to groundwater
- minimise environmental damage, such as bank erosion and damage to habitats
- maintain or restore the natural flow regime of the receiving watercourse
- maintain recharge to groundwater
- achieve environmental enhancements, improvement to wildlife habitats, amenity and landscape quality

Some examples of source control methods are shown in the following list:

- Porous surface pavements – water permeates through in to the soil or sub-surface reservoir which can then be allowed to discharge slowly rather than directly running off. This will minimise the volume of water that you might need to treat and can also recharge groundwater. Porous pavements need to be protected during installation from blocking by excessive silt contaminated water.
- Infiltration trenches – a shallow excavated trench backfilled with stone to make an underground reservoir. Runoff is diverted in to the trench and then filters in to the subsoil. The closer to the source the more effective this method will be.
- Infiltration basins – a shallow surface impoundment where water is stored until it gradually infiltrates in to the soil of the basin floor. The performance of the basin depends largely on the permeability of the soil and the depth of the water table.
- Filter drains or French drains - these are similar to infiltration trenches but also allow movement of run off slowly towards a watercourse allowing time for filtration, storage and some loss of water due to evaporation / infiltration.
- Swales – grassed wide shallow depressions which lead water overland from a drained surface in to storage or discharge system. They provide temporary storage for run off reducing high flows. Solids are retained and oily residues and organic matter broken down in the top layer of the soil and vegetation.
- Filter strips – vegetated sections of land designed to accept run off as an overland sheet flow. To be effective they should be 5 – 15 metres wide and are best employed on the upstream end of a drainage system. They are most effective at removing excess solids and pollutants before discharging to downstream system.

Other SUDS can be considered including ponds, detention basins (dry ponds) and wetlands.

At the planning stage of your project consider how your drainage can be managed by using SUDS. Pollution removal by these methods is achieved by sedimentation, adsorption, absorption, filtration and microbial action.

In Scotland, discharges of water run-off from construction sites are required to be treated by either a Sustainable Urban Drainage System (SUDS) or an equivalent equipped to avoid pollution. However, the final SUD System can't be an equivalent and must be a recognised SUD System.

2.2B SETTLEMENT LAGOONS OR TANKS

To be effective a settlement lagoon or tank should retain contaminated water long enough for silt to settle out. The length of time will depend on the type of silt, with finer clay solids taking longer to settle. If you use flocculants to aid settlement you must discuss this option with the regulator before use. Flocculants can themselves be polluting and/or toxic and need careful use and monitoring to be effective. The checklist below gives guidance on lagoon/tank operation.

Table 1 gives guidance on the volume of lagoon or tank needed for a three-hour settlement at a defined rate of inlet discharge.

Typical dimension of a settlement lagoon / tank for a three hour settling time			
Pump Diameter	Discharge rate into the lagoon	Length	Width
6 Inch Pump	3000 l/min	60m	20m
	6000 l/min	80m	27m
4 Inch Pump	1000 l/min	30m	10m
	2500 l/min	50m	17m
Assuming a tank / lagoon depth of 1 m , where length = three times the width			

Table 1: Settlement pond dimensions - the size of the tank/lagoon is determined by the rate of introduction of water.

Settlement lagoon / tank – a checklist
- maintain a constant pumped inlet rate
- minimise the inlet flow as much as possible by using energy dissipaters or rip rap aprons to reduce velocity
- position inlet pipe work vertically to dissipate energy
- provide lined inlet chamber to reduce velocity and sediment erosion by the flow
- line the inlet chamber and outlet weir with materials like geotextiles, brickwork, polythene or timber
- have a long outlet weir to minimise disturbance
- two or three lagoons in series will increase silt retention
- clean inlet chamber regularly
- monitor discharge quality frequently

2.2C FILTRATION

If you don't have the space for lagoons and the water is contaminated with course silt you may be able to use tanks filled with filter material. Single sized aggregates 5–10 mm, geotextiles or straw bales can be used as a filter. You must monitor carefully the inlet pump rate and discharge quality.

2.2D PUMP TO GRASSLAND

You must have permission from the local regulator and the landowner before planning to use this method of disposal. The discharge rate must match the rate of infiltration in to the soil which will vary with the type soil, amount of vegetation cover and the gradient.

2.2E DISCHARGE TO SEWER

If discharge to a foul sewer is possible you will require the permission of the local sewerage provider. You should approach them at an early stage in the project. They may issue a consent/authorisation limiting the volume and content of the discharge.

2.2F TANKER OFF SITE

If no other disposal routes are available then contaminated water can be collected and disposed off site by tanker. This may be a costly option and must be discussed with the local regulator at the planning stage of your project.

3. CONCRETE AND CEMENT

Fresh concrete and cement are very alkaline and corrosive and can cause serious pollution. Concrete and cement mixing and washing areas should:

- be sited 10 metres from any watercourse or surface water drain to minimise the risk of runoff entering a watercourse
- have settlement and re-circulation systems for water reuse, to minimise the risk of pollution and reduce water usage
- have a contained area for washing out and cleaning of concrete batching plant or ready mix lorries; see section 2.1d above
- collect wash waters and, where necessary, discharge to the foul sewer (you must have permission from the local sewerage undertaker for this), or contain wash water for authorised disposal off site

Wash waters from concrete and cement works should never be discharged in to the water environment.

4. OIL AND CHEMICALS

For clear definitions with regards to oils and their storage please refer to: England, storage must be compliant with The Control of Pollution (Oil Storage) (England) Regulations 2001. Scotland, storage must be compliant with The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) and The Water Environment (Miscellaneous) (Scotland) Regulations 2017.

4.1 STORAGE—GENERAL

Make sure fuel, oil and chemical storage on site is secure. Site the storage on an impervious base within a secondary containment system such as a bund, ideally fully enclosed to protect the sump from the elements. The base and bund walls should be impermeable to the material stored and the sump capacity must comply with the regulations, namely 110% of the single largest container stored or 25% of the combined total, whichever is greater. Site the storage area above any flood water level and where possible away from high-risk locations (such as within 10 metres of a watercourse or 50 metres of a well, borehole or spring), to minimise the risk of a spill entering the water environment. Detailed guidelines concerning above ground oil storage tanks can found in Environmental Safeguard Advice 2 - Above Ground Oil Storage Tanks.

Keep spill response and containment products compatible with your stored materials, close to and remote from your storage area and ensure staff are trained on how to use these products correctly.

Remove damaged leaking or empty drums from site immediately and dispose of any drums via a registered waste disposal contractor.

4.2 SECURITY

You should secure your site against theft and vandalism. Statistics show that damage from vandalism is a common cause of pollution. You can't use vandalism as a defence if you are taken to court because of a pollution incident.

Therefore take action to secure your site by:

- fitting lockable valves and trigger guns on pipe work from storage containers
- installing anti siphon valves in pipe work between containers and pumps
- installing armoured hoses
- storing tanks drums and mobile bowsers in a locked container or compound when not in use

4.3 REFUELING

The risk of spilling fuel is at its greatest during refuelling of plant. To minimise this risk:

- refuel mobile plant in a designated area, on an impermeable base away from drains or watercourses
- use a bunded bowser
- supervise all refuelling and bulk deliveries
- check the available capacity in the tank before refuelling
- don't jam open a delivery valve
- check hoses and valves regularly for signs of wear
- turn off valves after refuelling and lock them when not in use
- position drip trays under pumps to catch minor spills
- keep a spill kit with sand, earth or commercial products for containment of spillages
- provide incident response training to your staff and contractors

4.4 BIODEGRADABLE OILS

If possible use biodegradable chainsaw chain bar lubricant and biodegradable hydraulic oil in plant when working in or near watercourses. The regulators and its contractors use biodegradable oils for their own operations. Biodegradable oils are less toxic than most of the synthetic oil but should still be stored and used to the same standards as other oils.

4.5 TRADE MATERIALS

Sealant, coatings, adhesives and glazings can be toxic to plants and animals if released into the environment. Select, store and use these materials carefully to save resources and protect the environment. You must not use sealant and glazing compounds containing asbestos. You should:

- use water based or low solvent products
- avoid products containing lead as a drying agent and those containing hazardous solvents (toluene or chlorinated hydrocarbons)
- provide safe and secure storage

5. BRIDGE MAINTENACE AND STRUCTURE OVER WATER

Work to maintain bridges or other structures over or next to watercourses has a high risk of causing pollution. The maintenance work itself may require authorisation from the local regulator and you should contact them at an early stage in your plans to agree the most appropriate method of working and to agree an environmental management plan.
You may need authorisations if the bridge crosses a main river. Contact the local regulator prior to starting your work to confirm this

5.1 POLLUTANT CONTAINMENT

Dust, debris and wastewater are the most common pollutants produced by structure maintenance. You should choose a containment system designed to reduce the risk of pollution from your work. The system should take account of the sensitivity of the environment. The type of containment you need will depend on the sensitivity of the site.

Methods of containment include:

- air or water impenetrable walls
- rigid or flexible framing lined as necessary
- fully sealed joints
- airlocks or resealable entryways
- negative air pressure (achieved by forced or natural air flow) and
- exhaust air filtration

In sealed containment areas you should provide filtered ventilation to prevent the build-up of dust and minimise the possibility of air escaping through breaches of the containment.

Use physical cleaning instead of liquid chemicals such as caustic and acid solutions. Contain wastewaters from surface washings and agree the disposal method with the local regulator as part of the environmental management plan before you start work. In some circumstances, you may be able to use a barge with a wastewater containment facility for working over water, or dispose to foul sewer with prior permission of the local sewerage undertaker. You should contact the local regulator early on in the planning stages of the project so they can advise on pollution prevention methods.

The containment facility must be designed so that the structure does not obstruct the river flow beneath it to such an extent that it increases the risk of flooding to an unreasonable level.

5.2 PAINT REMOVAL

Paint removal methods include:
- abrasive blast cleaning
- blasting in a closed circuit
- preparation by various types of wet abrasive blasting or water jetting
- chemical stripping and
- hand or power tool cleaning

Abrasive blasting produces the greatest level of dust and debris. The use of vacuum attachments on power tools can reduce dust generation. Water cleaning methods produce less debris, but generate run-off, which needs to be contained and treated. Your local regulator can advise you on the best method of treatment.

Sample existing coatings for hazardous materials (eg lead) before starting to remove them. This can help determine the level of containment you will need. The level of containment needed depends on:
- the amount of paint to be removed
- the type and concentration of the hazardous materials
- the sensitivity of the surrounding environment

5.3 SURFACE CLEANING

You should avoid using grit blasting with slag-derived grit as they can contain significant levels of heavy metals such as copper. These can be toxic if they get in to the water environment. Reduce the potential for contamination by using garnet, low silica abrasive or recycled glass media with vacuum attachments.

5.4 PAINTING

Our advice for painting is much the same as for paint removal although the volume of waste and size of operations will be less. Remove dust and debris by sweeping or vacuum cleaning before painting. Paints can be applied onsite using brush, conventional spray or airless spray. Consider using electrostatic spray units to reduce the loss of product by over-spraying.

Carefully consider the type of paint you use. Although water based solvent free paints have lower environmental impact they may require more frequent application. Solvent-based paints could have a higher environmental impact but will last longer and require less maintenance. The decision to use water or solvent-based paints should be based on the environmental sensitivity of the area/surrounding environment and ease of access to the structure.

6. HERBICIDE USE

In England, Northern Ireland and Wales you must have written approval from the regulator to use herbicides in or near waters. Only approved herbicides may be used, and only by authorised contractors. If approval is given you, as the applicant, and the contractor are responsible for ensuring that the interests of other river users are not adversely affected.

In Scotland, aerial application of herbicides in or near the water environment needs approval from SEPA; also, you should consult with them on any other application of herbicide in or near the water environment, as pollution caused by such herbicide use will be deemed an unauthorised activity and enforcement action may be taken against the person responsible.

7. WASTE MANAGEMENT

Legally compliant waste storage and disposal are essential for effective pollution prevention.

You have a legal duty of care to make sure any waste you produce does not escape from your control. Waste must be transferred to an authorised registered or exempt waste carrier or waste manager. It must be accompanied by a full description of the waste and a waste transfer note and be disposed of lawfully.

Hazardous wastes, or special wastes in Scotland, such as oily wastes, acids, solvents and solvent-based products, have particular legal requirements and their movement must be accompanied by a consignment note. Everyone involved in the transfer of the waste, must keep copies of the consignment notes for proof of legal disposal.

If you are a hazardous waste producer you must seek advice and register accordingly with your local regulator

Draw up a site waste management plan.

Site waste management plan checklist

- Carry out a waste minimisation audit to identify where you can reduce the volume of waste you produce
- Reuse materials or use products that can be reused many times
- Substitute materials for less hazardous ones – eg biodegradable lubricants and water based paints
- Recycle waste where possible – contact your local council or waste contractor for recycling facilities.
- Segregate different wastes for recycling, hazardous waste and general waste and label them. Don’t mix or dilute hazardous wastes
- Store waste in suitable containers of sufficient capacity to avoid loss, overflow or spillage
- Store waste in designated areas, isolated completely from surface water drains and areas which discharge directly to the water environment.
- Cover or enclose skips unless they are stored undercover or within a building.
- Take waste off your site frequently; don’t allow large quantities to accumulate.

8. INCIDENT RESPONSE

You should immediately report to the local regulator any incidents that you have had or that could have had an environmental impact.

Incidents include spillages (oils and chemicals), contaminated run-off, flooding, riverbed disturbance, damage to underground services, damage to habitats, poor waste disposal and storage. If in doubt report it to your local regulator.
You should produce an Incident Response Plan as part of the environmental impact management of your work.

Include the following:
• list of key external and internal contacts
• reporting procedures
• site plan including drainage and location of storage/refuelling areas
• list of stored materials
• details of local environmental sensitivities, eg abstractors, high amenity areas and fish farms
• location of spill equipment
• procedures for spill containment and remediation

Train your staff and contractors in the use of spill equipment and how to manage and dispose of waste materials legally.
If you are using oil and chemicals in close proximity to a watercourse, store a suitable spill kit or sorbent materials nearby. Provide appropriate temporary storage for any oils and chemicals. Contain all spillages using absorbents such as sand, soil or commercially available booms or pads and notify your local environmental regulator immediately.