

WATERWAYS COMMISSION

Guidelines for the preparation of a dredging and dredge spoil disposal management plan

- a guide for proponents

**Waterways Guidelines No 9
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□ WATERWAYS MANAGEMENT

The Waterways Conservation Act was proclaimed in 1976 and established the Waterways Commission. The Commission's role is to conserve and manage the State's waterways.

The Act allows for the management of local waterways through the establishment of waterways management authorities. These authorities are community based bodies which take on the responsibility of planning, managing and protecting their local waterways. These authorities use the powers under the Act to help them protect their waterways.

Currently waterways management authorities exist for the Peel Harvey Estuarine System, Leschenault Estuary, Albany Waterways, Avon River and Wilson Inlet.

Note: These guidelines are designed for dredging operations within Waterways Commission Management Areas. Outside management areas the requirements of the Department of Transport, Department of Environmental Protection, Fisheries Department and the Local Government Authority must be met.

□ Dredging

Dredging operations have a high potential to detrimentally impact upon water quality and aquatic flora and fauna. Consequently the waterway management authorities closely scrutinise applications for dredging. If applications to dredge are approved a variety of conditions may be placed on dredging licences to ensure that environmental impacts are minimised.

Dredging can affect water quality by:

- Lowering dissolved oxygen levels;
- Increasing suspended solids in the water column which smother organisms, cause physical abrasion and clogging of organisms respiratory systems, and also reduce light penetration to aquatic plants;
- Mobilising contaminants and nutrients from the sediments;
- Altering the pH of the water.

A key condition of a dredging licence may be to prepare a Dredging and Dredge Spoil Disposal Management Plan (DDSDMP). The purpose of the plan is to document what areas will be used to dispose dredge spoil, how the dredging operation will be conducted, what measures will be taken to monitor and protect water quality, and how the spoil disposal site will be rehabilitated to prevent both spoil dispersion over time and degradation of the waterway.

The proponent must also obtain Department of Environmental Protection (DEP) approval for the proposed dredging. DEP will assess other environmental impacts in addition to water quality. This requirement and any others required by the local government authority can be run in parallel with the preparation of the DDSDMP. Some of the requirements of all three processes may also be identical.

The purpose of this document is to provide information to proponents who wish to undertake development which involves dredging. Issues to be addressed in the preparation of a Dredging and Dredge Spoil Disposal Management Plan are listed.

The guidelines need to be read in conjunction with the Commission's and the local waterway management authority policy on dredging.

Note: Approval from the local government authority must be obtained to dispose of the spoil or to gain access over or use a foreshore area for any purpose.

Licences

Dredging and Dredge Spoil Disposal Management Plans are a standard requirement of dredging licences issued by the Commission and the local waterway management authority under Section 46 of the Waterways Conservation Act 1976 (as amended). Section 47 of the Act is used as a framework for the content of Dredging and Dredge Spoil Disposal Management Plans.

Dredging licences are required for all dredging undertaken within any management area proclaimed under the Waterways Conservation Act.

DEFINITIONS

BACKGROUND LEVEL

The level of water quality (measured in a manner and at the location specified by the local waterways management authority) in the surface waters outside the influence of the waste discharge.

GUIDELINE AREA

The area in which these Guidelines shall be observed.

SURFACE WATERS

The surface waters of the guideline area including any river, stream, creek, canal, open drain, swamp, channel, lake, lagoon, tidal waters, natural or artificial watercourse, excluding lagoons or pondage used exclusively for the purpose of waste treatment.

DREDGE WATER

Turbid water and sediment created by the dredging operation, prior to any sediment settling or filtering (cleaning) process.

RETURN WATER

Water which is discharged, emitted or deposited in the receiving waters. Dredge water after completion of all cleaning processes.

RECEIVING WATERS

Waterways into which the cleaned dredge water (return water) is discharged.

TOXICANT

A substance which is poisonous to living things.

□ GUIDELINES

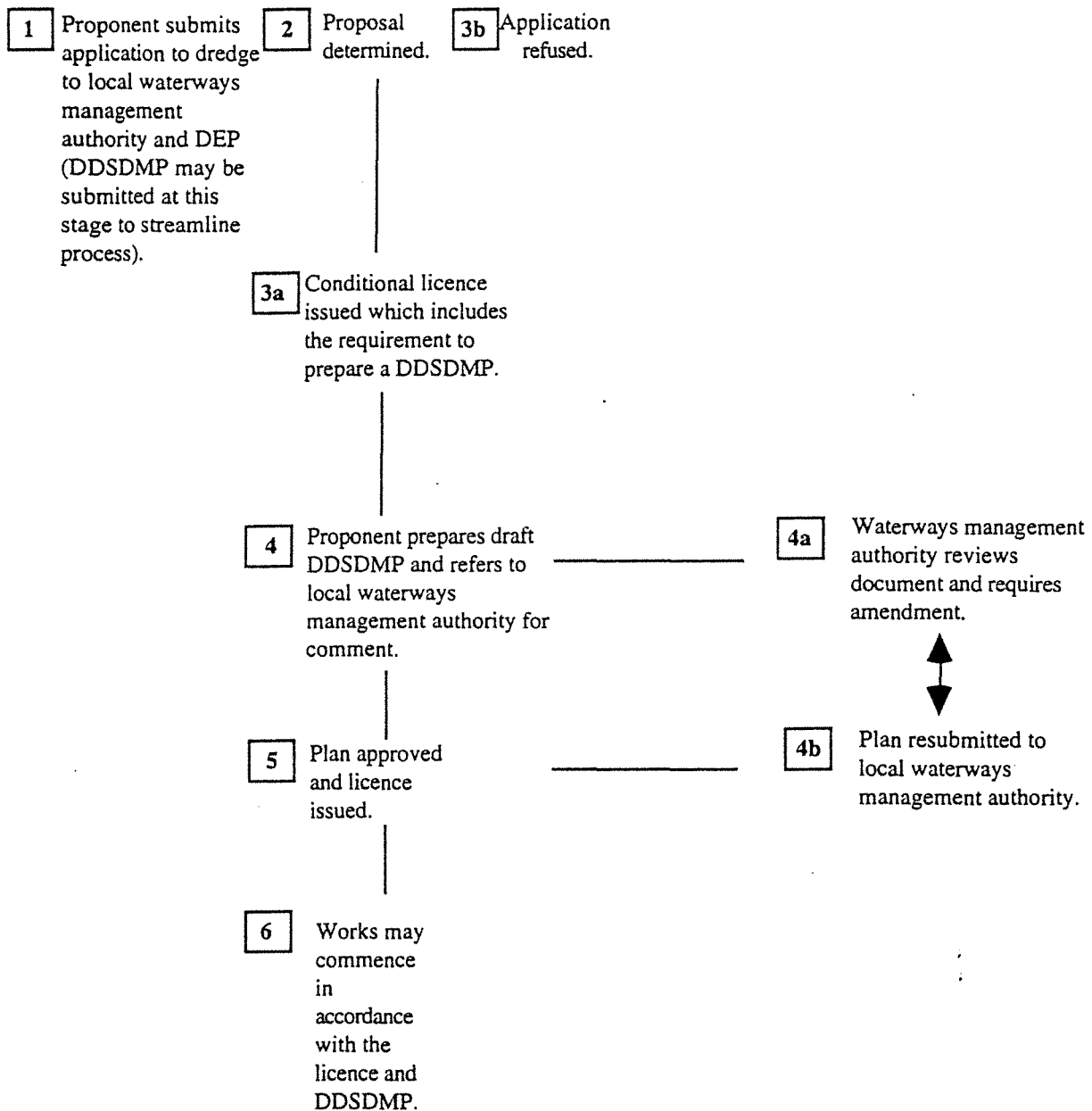
These guidelines apply to management areas proclaimed under the Waterways Conservation Act 1976.

Any operation which creates spoil should comply with these guidelines. Water quality within proximity to dredging operations shall comply with the water quality parameters in the guidelines. It is the responsibility of the proponent to ensure that dredging and dredge spoil disposal operations meet with these water quality criteria, and to take measures to prevent pollution, or degradation of the environment, to the satisfaction of the local waterways management authority.

Penalties apply for offences under the Waterways Conservation Act 1976. Operation which do not comply with the dredging licence will be halted by the local waterways management authority, and may be subject to prosecution.

An officer from the local waterways management authority may direct dredging and/or spoil disposal to cease if, in the opinion of the authority or its officers, a condition, or conditions of the dredging licence has been breached.

The Waterways Commission Management Authority planning process



□ **PREPARING A DREDGING AND DREDGE SPOIL DISPOSAL MANAGEMENT PLAN**

The key components of a Dredging and Dredge Spoil Disposal Management Plan are:

Definition of the study area

The study area should be defined, including specific cadastral references, bathymetry and maps to illustrate the location of the proposed operation. Discussion of the study area should include the exact location of both proposed dredging and the proposed dredge spoil disposal site, and a description of the spoil disposal area defining its size in hectares.

The purpose and aim of the plan

The purpose of the plan should be stated, together with its aims both from an engineering and an environmental viewpoint.

The tenure and zoning of the subject land

The plan should detail the tenure of the site being considered for dredge spoil disposal - including Crown reserves, vacant Crown land and private land, and the zoning of the subject land in the local authority Town Planning Scheme.

Description of the environment

The plan should briefly describe the physical and biological elements of the study area, and should outline elements of the environment which require protection from any adverse impacts of the dredging and dredge spoil disposal operation.

Relevant studies

Discussion should be directed towards the plans, studies, policies and recommendations that affect the study area. Examples include management programmes and plans developed for the particular waterway.

Description of the dredging operation

The Dredging and Dredge Spoil Disposal Management Plan should detail the proposed method of dredging, including the type and number of dredges to be used. The plan should describe the retention time of spoil in settling ponds, the methodology for sediment deposition and filtering of the dredge water, and the sequence and timing of the dredging and spoil disposal.

The plan should also include the volumes of material to be dredged (in cubic metres), and the composition of this material (quality, type and size of sediment, as well as contaminants within the sediment). The plan must also clearly state the final depths and contours to which the subject area will be dredged, and include a plan illustrating finished contour levels of the spoil disposal site.

Water quality monitoring and maintenance

The plan should describe water quality prior to the commencement of the dredging operation. The plan must also include a program of water quality monitoring during the operation and immediately following the completion of the operation.

The plan shall discuss how water quality monitoring will be conducted and the proposed frequency of monitoring. The monitoring program must address the following:

Characteristics of the return water as follows:-

- Biological oxygen demand**
- Total phosphorous**
- Total nitrogen**
- Oil and grease**
- Temperature**
- Salinity**
- pH**

Characteristics of the receiving waters as follows:-

- Sediment plume**
- Light attenuation and turbidity**

Where the history of the site suggests a likelihood of sediment contamination, or the history of the site is unavailable, the proponent should (in consultation with the local waterways management authority) also include the following water quality parameters into the monitoring program.

- Heavy metals particularly chromium, copper, lead, nickel, cadmium, tin and selenium.**
- Polycyclic aromatic hydrocarbons (PAH's).**
- Chlorinated aromatic compounds.**

The results of monitoring should be assessed against the water quality parameters in the following table. Results are to be submitted to the local waterways management authority, with updates on a regular basis, as identified in the Dredge and Dredge Spoil Disposal Management Plan.

Non compliance with the water quality parameters should be reported immediately to the local waterways management authority. The plan should address the proponent's commitments to mitigate the detrimental impacts of non compliance.

The dredging licence will normally be conditional on meeting the water quality parameters and failure to comply or take remedial action for non compliance may result in the licence being revoked by the local waterways management authority.

WATER QUALITY PARAMETERS

INDICATOR

CRITERIA

Dissolved oxygen

The concentration of dissolved oxygen in the return water shall not be less than 5.0 mg/L or 60% saturation, whichever is higher (estuarine waters).

pH

Return water discharges shall not cause the pH in the receiving waters to vary by more than +1.0 unit nor fall outside the range of 5-9.

Temperature

Return water discharges shall not cause the water temperature in the receiving waters to vary by more than 2°C from background temperatures in the receiving waters.

Nutrients

The concentration of nutrients in the return waters shall not exceed the background concentration in the receiving waters.

Suspended Solids

The suspended solids concentration of the return water shall not exceed the higher of:
a) the background concentration in the receiving waters or
b) 80 mg/L.

Odours and Colours

Return water discharges shall not produce objectionable odours or colours in the receiving waters.

Floatable Matter

Return water discharges shall not cause visible floating oil, foam, grease, scum, litter, or other objectionable matter in the receiving waters.

Settleable Matter	Return water discharges shall not cause the deposition of settleable matter which may adversely affect the visual, recreational and ecological values of the receiving waters.
Salinity	The return water salinity shall not vary by more than 10% from the background salinity levels in the receiving water.
Toxicants	The operator may be required to undertake toxicity analysis of the return water discharge. The level of toxicants shall not exceed the desirable concentrations in the ANZECC* guidelines for the protection of aquatic ecosystems. (However in applying these guidelines, the rate of dilution and dispersion of toxicants shall be considered).
Turbidity	Water turbidity as a result of the operation shall not increase in the receiving water so as to reduced secchi disk measurements by more than 15 cm from background levels.

Australian and New Zealand Environment and Conservation Council (1992).

Dredge spoil disposal

The plan must include a description of the method of dredge spoil disposal, with particular emphasis on limiting any potential detrimental impacts on the waterway.

It should be noted that 'sidecasting' of spoil is generally not the preferred disposal option. Proposals for sidecasting will be evaluated by the local waterways management authority based upon their merits, but must demonstrate that there will be no spoil mobility, and no increased turbidity beyond the criteria discussed in these guidelines.

The plan should include drainage and topographical plans of pre and post disposal site levels. Diagrams should also be included which illustrate the proposed methods to be employed to facilitate settling of particulates.

Use of Bunds

The plan should include details of how dredge spoil will be contained within the disposal site. If bunds are to be used, the plan must include drawings which illustrate bund construction, materials to be used, permeability of the bund, height, width, bund stability, erosion protection and scour protection.

Water Retention and Sediment Deposition

When pumped dredge spoil is disposed of, large amounts of water accumulate on site from the dredge slurry. The disposal site should be designed to maximise the duration of time for slurry to move from the delivery pipe to the receiving waters to facilitate the deposition of suspended sediment. The critical case occurs at the final stages of dredging when the free volume of the sedimentation pond is at a minimum.

Water Treatment

The Dredging and Dredge Spoil Disposal Management Plan should clearly document the methods of filtering and dispersing dredge water. Discussion should address the use of devices such as skimmer boxes, spill trays, piped outlets with filter cloth, subsoil drainage below sand filters, evaporation and infiltration, and the use of silt curtains. Discussion should also include methods that will be employed to ensure that outflow devices are not over topped, undermined or washed away.

The creation of a silt plume in the estuarine system will be regarded as a serious breach of dredging standards, and will result in the local waterways management authority halting operations until the situation is ameliorated. Repeated breaches of the licence conditions will result in the revocation of the dredging licence.

Minimising Turbidity

One of the most important aspects of the plan is to describe measures that will be taken by the proponent to minimise turbidity in the waterway, both at the dredge and at the discharge point to the receiving waterbody. This is particularly important for mechanical excavation of sediment from the waterway.

Dust Control and Noise

Dredging operations and spoil disposal are often a source of complaints particularly in regard to dust and noise emissions. The plan should address methods that will be used to minimise dust from the site, and commitments from the proponent to control dust. The plan must address the long term stabilisation of the site and methods that will be used to achieve this, together with a time commitment for their implementation. Measures to prevent long term spoil mobility should also be discussed.

The proponent should examine the issue of noise, to satisfy the requirements of the Noise Abatement Act.

Rehabilitation

The plan shall detail measures that will be taken by the proponent to rehabilitate the site including a landscape plan using locally derived species and stabilisation works. The plan should also address the rehabilitation of areas disturbed by vehicles such as foreshores adjoining the disposal site.

Contingency strategy

The Dredging and Dredge Spoil Disposal Management Plan should include a contingency strategy identifying the action that will be taken in the event that water quality parameters are breached. The contingency strategy will address the accidental creation of a silt plume. The strategy will identify parties responsible for remedial action. The strategy should include the immediate notification of the local waterways management authority as to the nature of the breach and the cessation of activities contributing to the breach. The strategy should note that the local waterways management authority may direct immediate cessation of activities through its officers, if it believes that operational criteria have been breached. The strategy should also take into account the need for rehabilitative measures.

Proponents commitments

For ease of reference the Dredging and Dredge Spoil Disposal Management Plan shall conclude with a list of proponents commitments to minimise any adverse impacts of the dredging and spoil disposal operation on the waterway. Such commitments shall include operation within water quality parameters, prevention of pollution, notification to the local waterways management authority of any breaches, implementation of a contingency strategy, and the rehabilitation of the spoil disposal area and any damaged areas.

Implementation

It is the proponents' responsibility to inform the local waterways management authority in writing at least one week prior to commencement and completion of dredging operations. Estimated commencement and completion dates should be included in the Dredging and Dredge Spoil Disposal Management Plan, along with a project management program advising of relevant deadlines during the period of the projects operation.

CHECKLIST AND SUGGESTED CONTENTS OF A DREDGING AND DREDGE SPOIL DISPOSAL MANAGEMENT PLAN

- Study area
- Purpose and aim of the strategy/programme/plan
- Tenure and zoning of the subject land
- Description of the environment
- Relevant studies, policies and plans
- Description of the Dredging Operation - volumes and nature of the material.
- Water quality monitoring and maintenance
- Dredge spoil disposal - including diagrams and plans.
- Contingency plan
- Proponents commitments
- Implementation

★ **REFERENCES**

Waterways Commission (1992) *Peel Inlet Management Programme 1992*. Waterways Commission, PERTH W.A..

State Planning Commission (1992) Statement of Planning Policy No. 2 - Peel Harvey Coastal Plain Catchment.

Australia and New Zealand Environment and Conservation Council. ANZECC (1992). Australian Water Quality Guidelines for Fresh and Marine Waters.

GUIDELINES IN THIS SERIES

1. Local government and waterways management - considerations in the planning and management of land near waterways
2. Guidelines for the preparation of foreshore management plans - a guide for proponents (Swan River Trust).
3. Guidelines for the development of a waterways protection precinct (in preparation).
4. Guidelines for residential wastewater disposal (in preparation).
5. Guidelines for the preparation of foreshore management plans in waterways management areas - a guide for proponents.
6. Guidelines for the preparation of waterways management planning documents. - a guide for community groups, local government and the community.
7. Guidelines for dewatering activities in the Swan Coastal Plain (Swan River Trust).
8. Guidelines for the preparation of nutrient and irrigation management plans - A guide for proponents (in preparation).