Environmental Best Practice Guidelines 2. Construction Practices in Waterways and Wetlands

Undertaking works in waterways and wetlands without expert advice can cause environmental harm that may be difficult and expensive to remediate.

1. Potential environmental effects

Undertaking works and operating machinery in and near waterways and wetlands can cause environmental harm by

- eroding stream beds and banks
- filling in deep holes and pools
- destroying riparian and wetland vegetation
- smothering aquatic vegetation
- killing aquatic animals
- polluting water
- exacerbating flooding.

2. Environmental management principles

Before starting works in waterways and wetlands a works plan should be prepared. The plan should outline the works to be undertaken and the measures that will be used to minimise the risk of causing environmental harm. The measures outlined should include those described below. These measures should be required of all contractors and plant operators working in waterways and wetlands.

2.1 Prepare for works

- Expert advice should be sought before excavating in waterways and wetlands. Depending on the scale of the works, advice may needed from one or more experts, including a stream biologist, river engineer, fluvial geomorphologist or hydrologist.
- The risk of causing environmental harm should be minimised. Short-term disturbances may be unavoidable but steps should be taken to minimise their effects at the site as well as upstream and downstream of the site. The environmental harm that could result from the works should be assessed and measures developed to minimise the harm. For example, works should be avoided when aquatic species are migrating and birds are breeding.
- The proposed construction methods and procedures should be specified in the works plan.
- All downstream neighbours and river users, such as water authorities, should be notified of the works.
- All relevant authorisations for the works should be obtained. See *Environmental Best Practice Guidelines 1. Legislative and Policy Requirements for Protecting Waterways and Wetlands when Undertaking Works.*
- Everyone involved in the works should attend a site briefing before starting work.

2.2 Minimise sediment disturbance and control erosion

- The works should be scheduled appropriately. For example, works should be timed to coincide with periods of low flow and completed quickly, and works should be stopped if conditions are not suitable, such as during and after heavy rain.
- Damage to the ground cover should be minimised and confined to the works site. Blading and grubbing of the banks and the area adjacent to the works site should be avoided. The width of

any access tracks should be minimised. Vegetation on unstable and erodible banks should be cleared by hand. If possible, trees should be felled away from the waterway.

- In-stream structures (culverts, etc) should be installed according to the manufacturer's specifications.
- The type and size of any heavy machinery and attachments (eg crab-grab) should be appropriate for the site and the works being done.
- All machinery should be kept out of the waterway on dry and stable areas within the works site.
- Existing crossings should be used to move equipment across the waterway. If there is no crossing and the stream must be crossed, any disturbance should be minimised. If crossing once, the machinery should be carefully 'walked' across the stream. If crossing many times, a temporary crossing should be made by laying a pad of clean rock at a shallow point of the waterway. The rock should be removed when works have finished.

Keep machinery off wet and unstable areas

- When excavating the channel, the flow should be diverted and the works site isolated. Sometimes, if the environmental risk is small and the flow is low, it may be possible to do the works without a diversion structure. The stream should be diverted by constructing a cofferdam, berm or temporary channel. The cofferdam should be constructed using sandbags, clean rock, steel sheeting or other non-erodible material. Clean rock is rock of varying type and size, that contains no fines, soil, wastes and contaminants. Temporary diversion channels should be protected by lining them with non-erodible materials to the high water mark.

If excavating the channel isolate the works site

- Boulders, rock, shingle, gravels, soil and vegetation from the stream bed and banks should not be used or removed without authorisation. Any use or removal should be specified by a river engineer.
- Excavated material should be placed well away from the waterway to minimise erosion back into the stream. Fill should not be pushed into the waterway or stored in flood-prone areas.
- Surface and sub-surface flows at the site should be managed to minimise erosion and sedimentation of the waterway or wetland. Geo-textile sediment fences should be used to stop sediment entering the water. They should be installed along the bases of fills and cuts, on the downhill side of soil stockpiles, and along stream banks and around wetlands adjacent to cleared areas. They should be installed along a contour, and be entrenched and staked. They should extend the full width of the cleared area.

Sediment fences need maintenance to remain effective

- Any runoff from the works site should be diverted into a settling pond or sediment trap, or through a vegetated area to stop sediment entering the waterway or wetland. The settling basin or sediment trap should be designed so its capacity is large enough for the size of the area being drained and the volume of water being treated.
- The publications listed in 'Section 3. References' contain detailed information on managing soil and water at works sites.

2.3 Avoid contaminant spills

- All workers should be trained and equipped to contain equipment spills and leaks.
- If a spill occurs, immediate steps should be taken to stop it polluting the water, including the ground water. The spill should be reported to the appropriate authorities as soon as possible.
- Petroleum products and other hazardous substances should be kept out of the waterway. Refuelling, top-ups and oil checks should be done well away from the waterway. Fuel, and servicing and refuelling equipment should be stored so the fluids cannot enter the waterway.

Non-toxic hydraulic fluids, such as vegetable-based fluids, should be used if possible. All equipment should be inspected and repaired regularly to prevent oil and other fluids leaking into the waterway.

- If equipment is to be immersed in the waterway, it should be cleaned beforehand to remove any external grease, oil and other fluids. Wash-down water is not to enter the stream.
- Dirt and mud should be removed from all equipment before entering the works site and waterway to avoid transferring weeds and disease. Wash-down water is not to enter the stream.
- Fresh concrete should be kept out of the waterway. If practical, prefabricated structures and precast components should be transported to the site and assembled on site. Any cast-in-place concrete should be isolated from the waterway for at least 48 hours to allow the pH to neutralise.
- Paints should not be allowed to enter the waterway when constructing, repairing and maintaining in-stream structures.
- When using wood treated with preservatives, the chemicals should be given enough time to fix before immersing the wood in the water.

2.4 Stabilise and rehabilitate banks

- The site should be rehabilitated when the works have finished. If practical, native vegetation should be established on all exposed soil surfaces, including the headslopes of any bridges and culverts.
- Temporary erosion control measures, such as geo-textile silt fences, diversion ditches, sediment traps and temporary seeding with fast growing annuals, should be used to control erosion at the works site and in the table drains of any approach roads. These should remain in place until the long-term erosion control methods are established and functioning.
- Long-term measures should be used to control erosion at the works site. Suitable measures include slope stabilisation, revegetation, soil coverings, rip-rap and armouring, check dams, sediment traps, brush barriers and vegetation filters. The measures used should be inspected and maintained regularly to make sure they are effective.

3. References

Hobart Regional Councils. 1999. *Guidelines for Soil and Water Management.* Hobart Regional Councils, Hobart.

Hobart Regional Councils. 1999. *The Soil and Water Management Code of Practice for Hobart Regional Councils.* Hobart Regional Councils, Hobart.

Launceston City Council. 2000. *The Soil and Water Management Code of Practice for Launceston City Council.* Launceston City Council, Launceston.

These guidelines should be used in conjunction with the appropriate technical advice and literature.

Checklist

This checklist summarises the environmental management principles outlined in *Environmental Best Practice Guidelines 2. Construction Practices in Waterways and Wetlands.* The plan of works prepared should describe the proposed works and show that the measures listed below will be used to minimise the risk of causing environmental harm during and after the works.

- ❑ Works plan prepared

Prepare for works (Section 2.1)

- ❑ Expert advice sought
- ❑ Risk of causing environmental harm assessed
- ❑ Construction methods and procedures specified
- ❑ Downstream neighbours notified
- ❑ Water authorities notified if appropriate
- ❑ Appropriate authorisations obtained
- ❑ All site workers briefed

Minimise sediment disturbance and control erosion (Section 2.2)

- ❑ Works scheduled appropriately
- ❑ Ground cover disturbance minimised
- ❑ In-stream structures installed to manufacturer's specifications
- ❑ Heavy equipment appropriate for site and works
- ❑ Machinery restricted to dry and stable areas
- ❑ Crossing sites selected if appropriate
- ❑ Works site isolated from channel
- ❑ Any removal of boulders, rock, shingle, gravels, soil and vegetation authorised
- ❑ Excavated material placed away from waterway
- ❑ Sediment control devices selected and sited appropriately

Avoid contaminant spills (Section 2.3)

- ❑ Contingency plan prepared that outlines measures to minimise likelihood of spills on site and response if spills occur
- ❑ Workers trained and equipped to contain spills
- ❑ Refuelling and servicing equipment located away from waterway
- ❑ Arrangements made to clean vehicles and other equipment away from waterway
- ❑ Hazardous materials kept out of waterway

Stabilise and rehabilitate banks (Section 2.4)

- ❑ Site rehabilitated and stabilised
- ❑ Temporary erosion control measures installed
- ❑ Long-term erosion control measures installed and inspection and maintenance plan prepared