

LAND MANAGEMENT

SUSTAINABLE LAND

Small Flood Detention Dams

Main Points

Small dams have been used as gully erosion control measures in the pumice areas of the Bay of Plenty and Taupo for many years. They can range in size from quite small to very large.

What is a Flood Detention Dam?

These dams control the discharge of surface water flowing into or down a 'dry watercourse' in a storm so the discharge can be carried by the stream without significant bank erosion or bed scour.

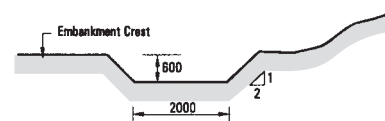
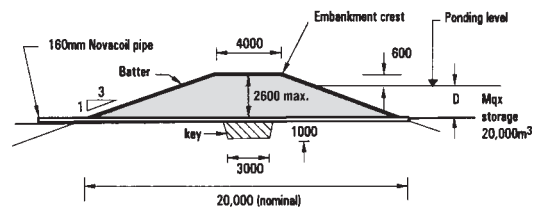
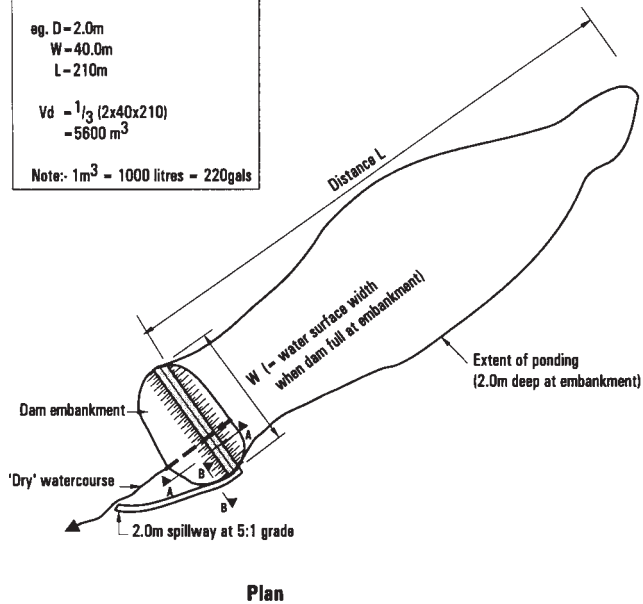
The dams should have a catchment area of less than 40ha to safely handle a one in ten year rainfall event. A spillway to allow for larger storm events is an essential part of the structure.

Construction Criteria

- A catchment area above a floodwater control dam should not exceed 40ha.
- The top of the dam should not be higher than 2.6 metres including 600mm of freeboard (this will minimize construction costs and not require a resource consent). It will need to be keyed in to the foundation in the same manner as a conventional stock water dam.
- Topsoil will need to be stripped from the dam embankment site before construction and from the storage area if reshaping is required. Care is needed to ensure the storage area is not below the level of the inlet pipe.



Estimate of Volume Stored
 $= \frac{1}{3} (D \times W \times L)$
 eg. D = 2.0m
 W = 40.0m
 L = 210m
 $V_d = \frac{1}{3} (2 \times 40 \times 210)$
 $= 5600 \text{ m}^3$
 Note: $1 \text{ m}^3 = 1000 \text{ litres} = 220 \text{ gals}$



- The base of a 2.6m dam needs to have a cross section width of 20m with side batter slopes of 3 horizontal to 1 vertical. This will allow a ute to drive up the sides without traction problems.
- A grassed spillway at least two metres wide and a horizontal level cross section and a grade of no more than 5 horizontal to 1 vertical is needed to cope with flood water. The spillway should start 600mm below the crest of the dam embankment. Water must be spread evenly across the spillway when operating.
- One 160mm Novacoil pipe is used to take the water through the dam. The inlets must be at the lowest point to ensure no water is stored permanently behind the wall, which means the bottom of the storage area is always grassed. It takes half a day or more for a dam to empty.
- A motor scraper and bulldozer are required to build a compacted dam. Compacting should be done with the rubber tyred vehicle in layers of no more than 200mm. This will take from three to five days depending on the size of the site chosen. Around 1500m³ of compacted material is required to

- construct an average dam wall of 40m length.
- The dam and all exposed areas must be topsoiled and oversown immediately with a grass/legume seedmix such as: 30% Lotus Maku; 20% annual ryegrass such as Moata; 20% Yorkshire Fog such as Massey Basyn; 10% cocksfoot; 10% white clover; 5% subterranean clover and 5% browntop at a rate of 45kg/ha with fertilizer at a rate of 1000kg/ha Use a temporary electric fence until the pasture is established.
- Provided that dams are properly constructed their maintenance requirements are minimal. Keep the dam wall and spillway grassed and the inlet and outlet pipes clear. Protect the pipes with concrete blocks to prevent stock/vehicle damage. The pipe outlets are a point of scour and may require extra protection to prevent excessive scouring. The inlet and outlets will require checking periodically to ensure they are clear. An intake grill to prevent debris blocking the Novacoil pipe will be required.
- Keep stock off the structure until all surfaces are established in pasture.

Resource Consents

A resource consent is NOT required provided:

- a) the catchment area of the dam is less than 50ha
- b) the depth of water is no greater than 3m at any time
- c) the volume of water retained is no greater than 20,000m³
- d) a spillway is constructed to prevent the dam being overtopped in a storm event larger than the capacity of the dam
- e) the retained water shall not encroach onto neighbouring properties unless the neighbouring property owner agrees.

Key Points of Dam Design

- A catchment area above a floodwater control dam should not exceed 40ha.
- The dam embankment crest should not exceed 2.6m in height, including 600mm of freeboard.
- Topsoil will need to be stripped from the dam embankment site prior to construction and from the storage area if reshaping is required.
- The base of a 2.6m dam needs to have a cross section width of 20m with a side batter slopes of 3 horizontal to 1 vertical.
- A grassed spillway of at of at least 2m width and a horizontal level cross section and a grade of no more than 5 horizontal to 1 vertical is needed to cope with flood water.
- One 160mm Novacoil pipe is used to take the water through the dam.
- A motor scraper and bulldozer are required to build a compacted dam.
- The dam and all exposed areas must be topsoiled and oversown immediately with a grass/legume seedmix.
- An intake grill to prevent debris blocking the Novacoil pipe will be required.
- Keep stock off the structure until all surfaces are established in pasture.

For further information

For further information on flood retention dams, contact Hawke's Bay Regional Council Land Management staff for advice.

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