



10(a) Bridge and culvert design information

The following information is required to accompany resource consent applications for bridges or culverts on waterways. Please answer all questions if possible. If you do not know the exact answer(s) an approximate answer will do.

You may wish to discuss the data requirements with one of Greater Wellington's resource advisors.

Please attach any other useful information, calculations, plans or descriptions.

1. Give a full description of why the works are to be constructed:

2. **Catchment area**

(1) What is the area of the catchment above the site of the proposed bridge/culvert?

_____ hectares

(2) What is the topography (landform) of the area (eg, flat, gently rolling, mountainous)?

(3) What is the shape of the catchment (eg, long, circular, oval, fan)? _____

(4) What is the length from the site of the proposed bridge/culvert to the remotest point of the catchment?

_____ km

(5) What is the soil type of the catchment (eg, clay, rock, loam, sand)? _____

(6) What are the vegetation types that could produce debris? _____

3. **Design data**

(1) Please complete at least one of the following methods of analysis and attach calculations. Results of flow frequency analysis should be used if available.

(a) Tech Memo 61 - use modified TM61 formula for catchments less than 25 km².

(b) Rational method - give estimated run-off coefficient "C" _____

(c) Regional flood estimation of Hydrology Centre Publication No. 20 Flood Frequency in New Zealand.

(2) What is the time of concentration (flow time from the furthest point of the catchment to the site?)

(3) What is the design rainfall? _____ mm/hour [not required for Publication No. 20.]

(4) What is the design discharge? _____ M³/s

What calculation method did you use? 1(a) 1(b) 1(c)

Other, specify _____

(5) What is the design discharge frequency (return period or annual exceedence probability)?

(6) Do you have any measured flows? Yes No

If yes, please attach showing date, discharge (m³/s), estimated frequency and method of measurement.

(7) What is the highest known flood level at the site? _____ m

(8) What was the estimated frequency for this flood event? _____ years

(9) What was the method for obtaining this flood level? _____

(10) Are there any other bridges or culverts nearby on the same channel? Yes No

If yes, give details: _____

(11) What is the velocity of design flood for the proposed structure? _____ m/s

(12) Are the flood levels affected by backwater effects? Yes No

Please describe: _____

[Continue on a separate page if necessary]

4. Channel data

Provide a representative cross section of the river/stream.

(1) How wide is the channel? _____ m

(2) What is the gradient at the site of the proposed bridge/culvert? 1 in _____

(3) Is the flood gradient different to the normal gradient? Yes No

If yes, what is the flood gradient? 1 in _____

(4) Are there any features likely to affect the normal and flood gradients of the channel or cause channel restrictions? Yes No

If yes, what are these features? _____

(5) Please describe the bed material type and size (eg, silt, gravel, coarse or fine):

(6) What is the estimated value of Manning's n upstream of the proposed culvert/bridge site?

5. Culverts

(1) What type of culvert do you propose to build (eg, pipe, box, arch)? _____

(2) What is the estimated design flood level and waterway area of the proposed structure?

Flood level: _____ m

Waterway area: _____ m²

(3) Are overflows anticipated from the culvert? Yes No

If yes, will the overflow return directly to the waterway? Yes No

If no, where will the overflow go? _____

(4) Does the design anticipate surcharge? Yes No

If yes, please describe the effects and identify affected parties (see Form 1):

(5) What is the length of the proposed culvert? _____ m

(6) What is the slope of the culvert? 1 in _____

(7) Do you have any inlet/outlet details? Yes No

If yes, please attach.

(8) What provision will you make to prevent overflow scour or approaches?

[Continue on a separate page if necessary]

(9) Will a stilling basin be used? Yes No

If yes, please give details: _____

(10) Is there flood protection downstream? Yes No

If yes, please describe: _____

(11) Will debris be collected upstream? Yes No

(12) What allowances have been made in the waterway for collected debris?

(13) Attach a stream cross section showing the culvert and associated filling.

6. Bridges

(1) What is the estimated design flood level and waterway area of the proposed structure? _____ m

(2) Will the bridge cause overflows upstream? Yes No

If yes, will the overflow return directly to the waterway? Yes No

If no, where will the overflow go? (Please identify any affected parties on Form 1.)

(3) What is the angle of river approach to the bridge? _____ degrees

(4) Could river meanders or erosion alter the approach angle? Yes No

(5) What is proposed as abutment protection? _____

Attach details of any bank protection proposed for abutment.

(6) What is the depth of the scourable bed material? _____ m

(7) What is the maximum depth of scour for design flood? _____ m

(8) Will debris be collected upstream? Yes No

(9) What allowances have been made in the waterway for collected debris?

[Continue on a separate page if necessary]

(10) Attach a plan showing pier and abutment positions, span lengths, pier/pile founding level.

(11) Attach a waterway cross section.

For office use only

Consent No. _____

Renewal: Yes No