Concrete Pipe Association of Australasia

Precast concrete box culverts
New Zealand

Precast box culverts are high quality, low maintenance, concrete structures.

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Applications.

Applications in New Zealand include:

- stormwater culverts
- Waterways/channels
- Creek crossings
- Small bridges
- Pedestrian tunnels
- Stock underpasses
- Service tunnels
- Vertical chambers
- Pump stations

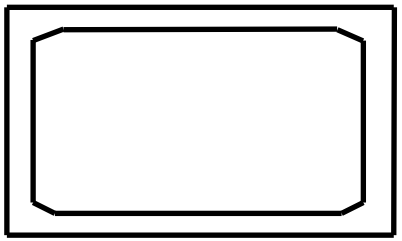
- There are benefits with adopting the use of precast box culverts:

- They are available in a number of configurations:

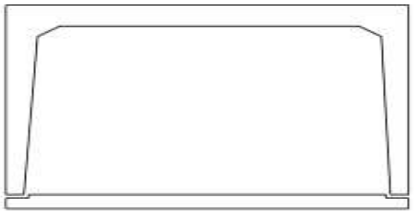
Benefits

- Sustainability in design with project specific product designs.
- Low fill cover heights permissible
- Zero fill cover heights permissible
- Range of configurations, widths and heights
- Customizable for special conditions or shapes
- longer life compared to steel culverts
- Improved hydraulics compared to steel culverts
- Speed of installation
- Ease of installation

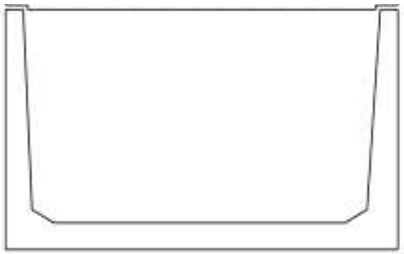
Configurations



FULL BOX
(Most common)



Portal and Base



Duct and Lid

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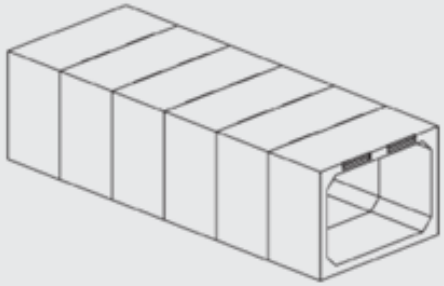
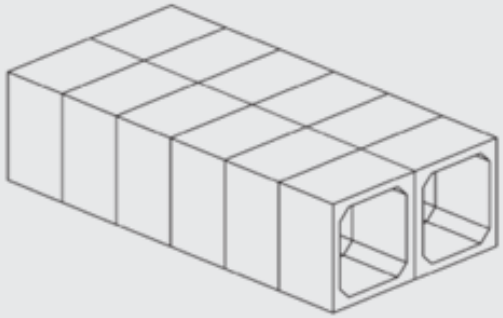
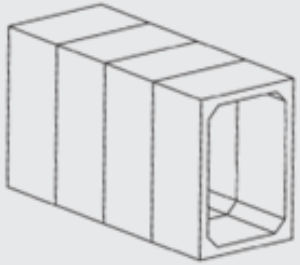
Configurations



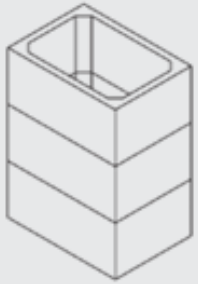
Standard box culvert
or rural stock underpass



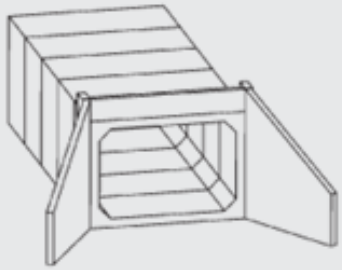
Twin cell box culverts



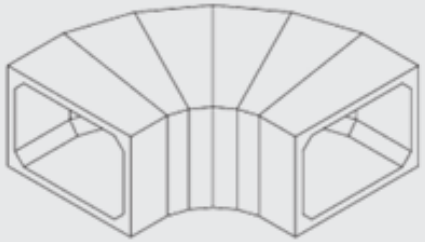
High headroom box culverts



Vertical box culverts
for chamber applications



Box culvert with optional
precast wingwall and headwall panel



Box culvert with splay
(note: splay to one end of box unit only)

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Complete solution available including wingwalls and aprons

Size Range

Available off the shelf size ranges vary by manufacturer.

Standard Width range from 1.0m to 6.0m

Standard Height range from 0.9m to 3.0m

Customised shape and size can be designed and manufactured per project specific specifications.

Customised penetrations and access points are available.

Product dimensions (wall thickness) are governed by design for loading and durability

Example of custom designed box culvert for Kiwi Rail

Example of underpass

Design

- Box culvert components in New Zealand are designed for load combinations in accordance with NZS 3101:2006 Concrete Structures Standard and the Waka Kotahi (NZTA) Bridge Manual.
- Typical live loads are HN and HO, however project specific loads can be accommodated including rail loads and construction loads
- Designs are available for project specific heights of fill including zero heights of fill.
- Member companies have expert and experienced designers using company specific design tools and software enabling quick, yet detailed, well engineered analysis.

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Sustainability

- Factory cast box culverts minimise use of materials through efficiencies and quality that are simply not available for insitu alternatives.
- Precast box culverts can be manufactured utilizing supplementary cementitious materials which substantially reduce the carbon footprint of products.
- Uniquely, carbon reduced solutions for box culverts provide for enhance durability with no reduction in design life.
- Design life of precast box culverts is 100 years
- Typically precast box culvert manufacture occurs close to the installation site minimising transport distances and related carbon and green house gas costs.
- Project specific design results in optimised designs minimising the use of valuable materials.

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