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SHAW
PRECAST SOLUTIONS

Box Culverts

PRODUCT GUIDE & TECHNICAL REFERENCE MANUAL

Providing the right solutions.

BOX CULVERTS

A box culvert unit may be either three or four sided. A three sided box culvert unit is a rigid portal frame with two vertical legs and a horizontal deck. Three sided units allow for brook and stream crossings maintaining the natural streambed.

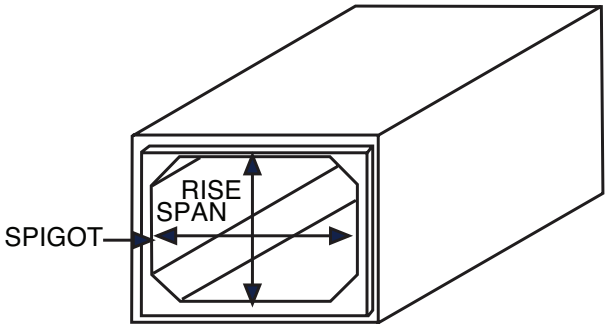
Typically the legs of a three-sided culvert are supported on concrete footings. A four-sided box culvert unit consists of a top deck slab, two vertical walls and a base slab that forms a rigid frame. The bottom slab allows for a smooth precast concrete invert in place of a streambed. Baffles, as specified by the Department of Fisheries, can be provided in the bottom of a four-sided box culvert to facilitate fish migration. Headwalls, sloped end sections and cut-off walls are available in standard or project designs.

A four sided box culvert unit is often used as a permanent service tunnel or carrier tunnel for underground piping.

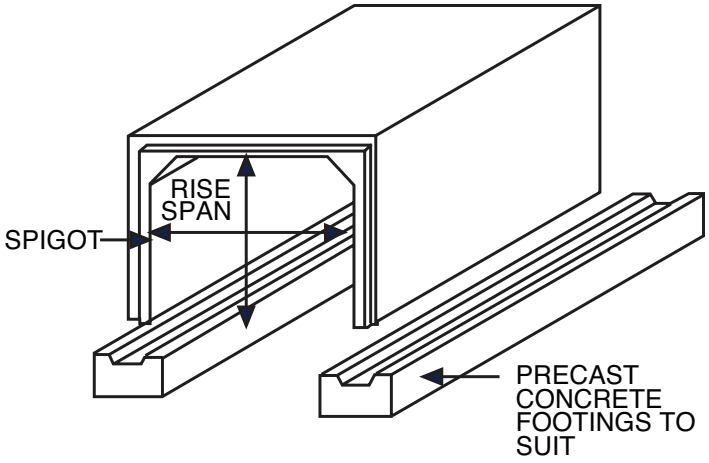
Precast box culverts are high quality, low maintenance concrete structures that have a large number of applications including storm sewers, service tunnels, or small bridges for stream crossings.

A box culvert may be either three or four sided. Three sided culverts allow for brook and stream crossings maintaining the natural streambed. Typically the legs of a three-sided culvert are supported on concrete footings.

A four-sided box culvert has a base slab that allows for a smooth precast concrete invert in place of the natural streambed. Fish baffles can be provided in the bottom of a four sided box culvert. Headwalls, sloped end sections and cut-off walls are available for project specific designs. Four sided box culvert units are often used as permanent service tunnels for underground services and piping.



FOUR SIDED BOX CULVERT



THREE SIDED BOX CULVERT

Two or more lines of box culverts may be placed side by side to create a twin barrel or multi barrel installation. A multi-barrel installation provides additional flow capacity, which may be required for larger streams

The structural design for box culverts is carried out by experienced Professional Engineers at Shaw Precast Solutions. Stamped shop drawings and technical specifications can be produced upon request for each project. Shaw Precast Solutions offers one on one consultation for layout and design of box culvert projects. We will assist on the project from the conceptual stage, through to final design and on site installation.

Shaw Precast Solutions provides the joint materials and lifting devices required for on site installation. The contractor provides all other rigging and equipment.

Shaw Precast Solutions produces precast box culverts over a broad range of standard sizes. Non-standard box culvert sizes can be produced upon request.

REVISED DECEMBER 26, 2012

AVAILABLE BOX CULVERT SIZES:

RISE	SPAN													
	2ft	3ft	4ft	5ft	6ft	7ft	8ft	9ft	10ft	11ft	12ft	13ft	14ft	15ft	16ft
	610 mm	914 mm	1219 mm	1524 mm	1829 mm	2134 mm	2438 mm	2743 mm	3048 mm	3353 mm	3658 mm	3962 mm	4267 mm	4572 mm	4877 mm
2ft / 610 mm															
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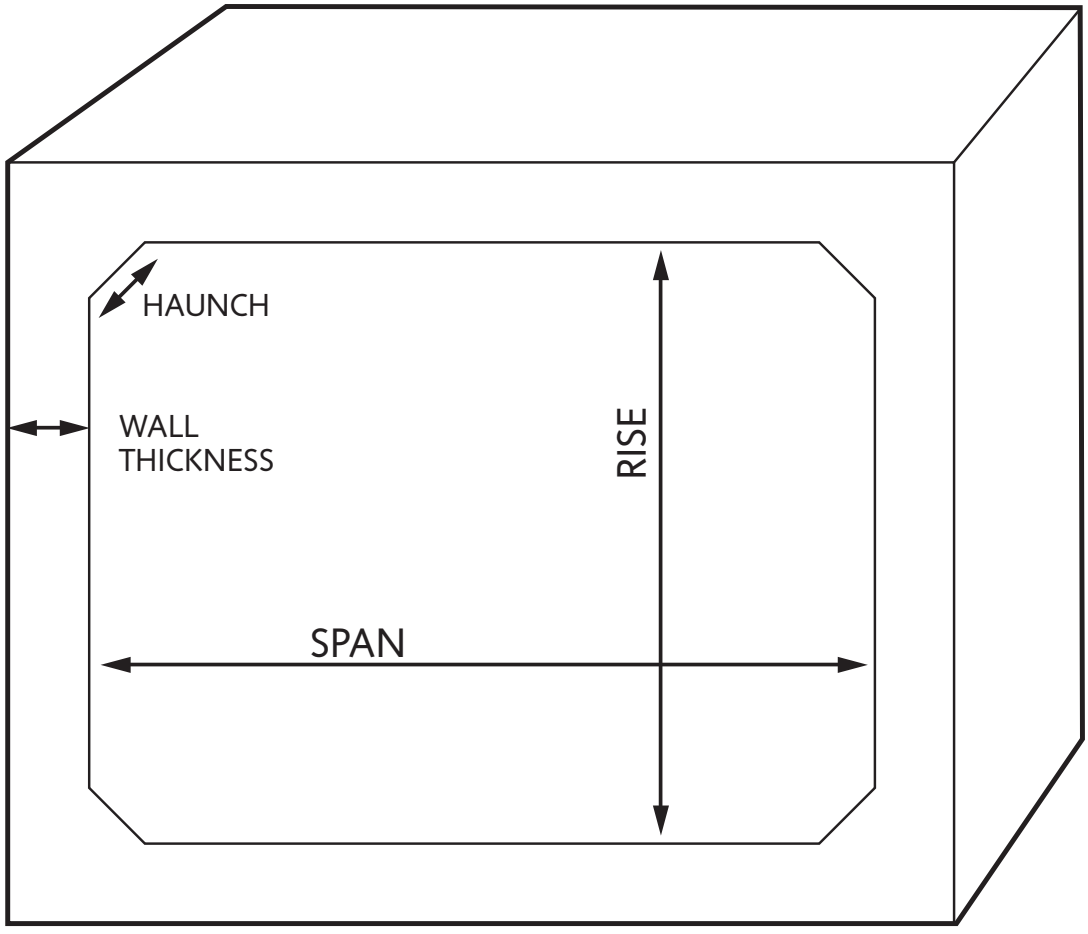
11ft / 3353 mm															
12ft / 3658 mm															
13ft / 3962 mm															
14ft / 4267 mm															
15ft / 4572 mm															
16ft / 4877 mm															



IMPORTANT NOTES:
Available Haunch Sizes are: 6 inch (152mm), 8 inch (203mm) and 12 inch (305mm)

Span and Rise are available in increments of 4 inches (102mm)
For example, 6 ft 8 inch x 8 ft 4 inch (2032mm x 2540mm)

Wall thicknesses are available in 2 inch (51mm) increments
For example, 2 inch, 4 inch, 6 inch, etc...

Haunch Size	Min. Rise	Min. Span
6 inch	2 ft	3 ft
8 inch	3 ft	3 ft
12 inch	4 ft	4 ft

INSTALLATION PROCEDURE

A Shaw Precast Solutions representative is available to provide hands on technical assistance during the installation of box culverts upon request. An overview of the straighforward installation procedure for a box culvert project follows:

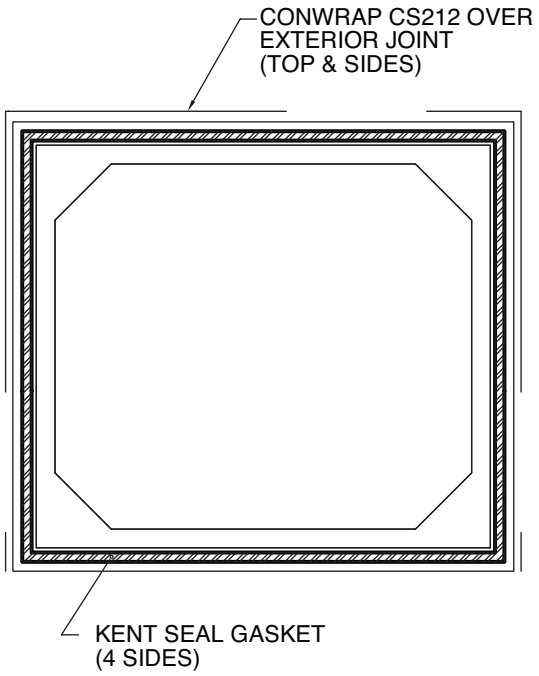
FOUNDATION PREPARATION - The required excavation is carried out and the subgrade is proof rolled. Unsuitable materials below subgrade are removed and replaced with compacted granular backfill. A mattress of granular material is placed and compacted to the proper line and grade.

CULVERT REPLACEMENT - The first box culvert is replaced at the low end of the culvert run with the bell pointing uphill. Care is taken to position the first box culvert correctly as it determines the line and location for the completed structure.

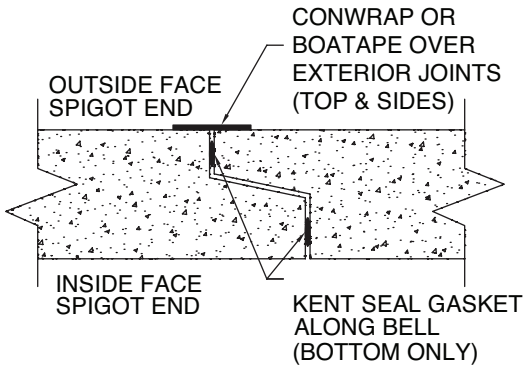
Prior to placement of all subsequent box culverts a 150mm wide by 75mm deep trench is established in the bedding material from being forced into the joint as the spigot of the next box culvert is inserted into the bell of the previous culvert.

JOINT MATERIAL - The bottom joint of the box culvert is sealed by placement of a butyl mastic sealant (Kent-Seal) on the bottom bell of each culvert once it is in place. As the spigot of the next box culvert is inserted into the bell it compresses the mastic. Once the box culverts are in place the side and top joints are sealed at the exterior with strips of polyolefin backed exterior joint wrap (ConWrap). Once the joints have been sealed, the culvert can be backfilled as per project specifications.

JOINT WATERPROOFING



TYPICAL JOINT DETAIL



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ADVANTAGES

A PRECAST BOX CULVERT WILL PROVIDE:

A HIGH QUALITY PRODUCT: Fabrication of box culvert units by experienced crews in a controlled environment ensures a high quality product. Units are cast in the plant under comprehensive quality control eliminating the drawbacks imposed by weather and site conditions.

ECONOMY: Precast box culverts are cost competitive with cast in place structures.

QUICK AND EASY ON-SITE INSTALLATION: The installation of a box culvert involves preparation of the site, placement and backfilling of box culvert sections. Depending on project size, preparation of the site may be completed in a matter of hours. This preparation work may be scheduled for immediately prior to delivery of the precast culverts to the site. Placement of the culvert units is usually carried out with a crane and is a straightforward and rapid operation.

SCHEDULE: Precast fabrication of box culvert units reduces the amount of work on-site and possible impact of weather on project schedules. The culvert sections can be installed, backfilled and placed into service immediately upon delivery to the site. Box culvert units can be pre-ordered to allow projects to proceed on-site in early spring.

REDUCED WATER CONTROL COSTS: On projects where the work site involves a water course, a precast structure eliminates the need to maintain a dry site for the entire duration of the project to prevent damage or disruption to form work, rebar, etc. reducing water control requirements and costs.

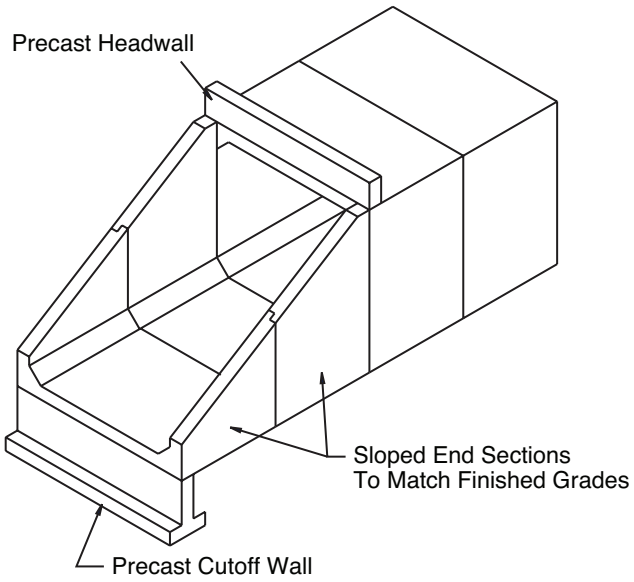
EASE OF INSPECTION: The Purchaser has the option to inspect the box culvert units at the plant prior to delivery. With cast in place structures, deficiencies such as low concrete strength represent a costly problem as the product is already in place.

DURABILITY: Precast concrete products have all the durability advantages of high quality concrete, without the concern of breakdown of protective coatings, corrosion or other problems associated with other materials. Precast concrete culverts are a low maintenance solution.

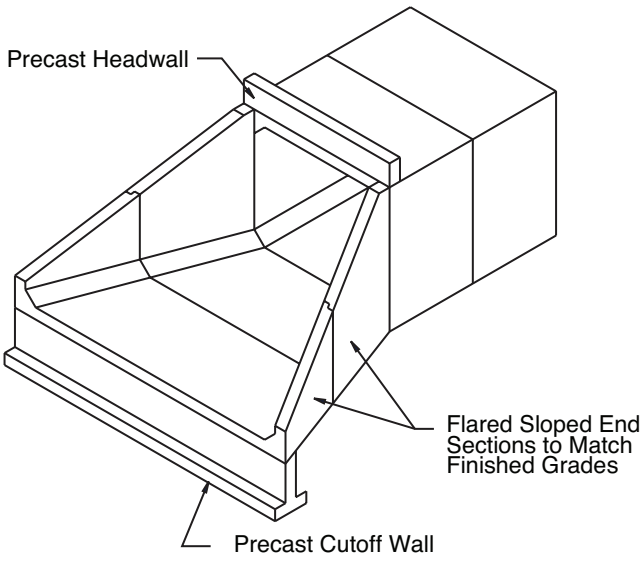
FLEXIBILITY IN DESIGN CONFIGURATIONS:
Because of the nature of precast concrete products, Designers can achieve a great range in configurations in culvert layouts, geometry, alignment and capacity. Special box sections can be fabricated to meet unusual conditions or design requirements. For example, radius box sections, and angular bend sections can be fabricated to accommodate changes in alignment, transition units can be fabricated where a change in culvert size is required, wyes and tees can be fabricated to allow connection of round pipe sections to the box culvert. Our Technical team is readily available to discuss possible design options, and their feasibility.

SLOPED & FLARED END SECTIONS

SLOPED END SECTIONS



FLARED END SECTIONS



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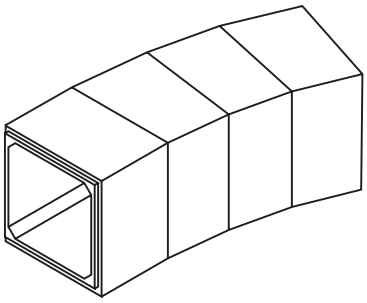
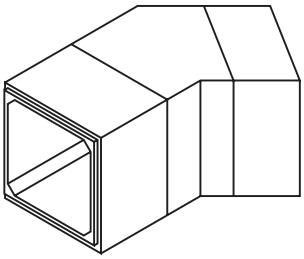
SPECIAL BOX SECTIONS

RADIUS BOX SECTIONS

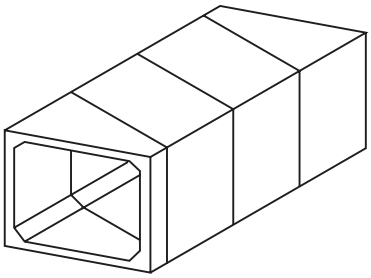


Cutoff Wall (Dowel Holes are Cast Into Floor Slab, and Reinforcing is Provided for Doweling On-Site)

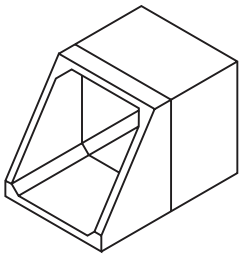
ANGLED BEND SECTIONS



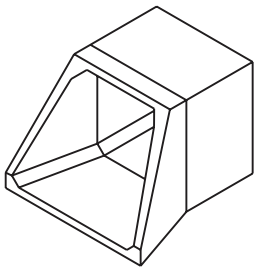
SKEWED END SECTIONS



SLOPED END SECTIONS



FLARED END SECTIONS

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