

<b>1353 PRECAST BOX CULVERTS</b>
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## 1 GENERAL

### 1.1 RESPONSIBILITIES

#### Objectives

General: Provide precast box culvert units including construction of base slabs as documented.

#### Performance

Requirements: ~~[complete/delete]~~

#### Design

Designer: ~~[complete/delete]~~

Design life of culvert: ~~[complete/delete]~~

Authority requirements: ~~[complete/delete]~~

### 1.2 CROSS REFERENCES

#### General

Requirement: Conform to the following worksection(s):

- 0136 General requirements (Construction)
- 0152 Schedule of rates – supply projects.
- 0161 Quality (Construction).
- 0167 Integrated management.
- 0319 Minor concrete works.
- 1101 Control of traffic.
- 1112 Earthworks (Roadways).
- 1121 Open drains, including kerb and channel (gutter).
- 1141 Flexible pavement base and subbase.
- 1171 Subsurface drainage.
- 1172 Subsoil and foundation drains.
- 1351 Stormwater drainage (Construction).
- 1352 Pipe drainage.
- 1354 Drainage structures.

### 1.3 REFERENCED DOCUMENTS

#### Standards

General: The following documents are incorporated into this worksection by reference:

AS 1012	Methods of testing concrete
AS 1012.9-1999	Determination of the compressive strength of concrete specimens
AS 1379-2007	Specification and supply of concrete
AS 1478	Chemical admixtures for concrete, mortar and grout
AS 1478.1-2000	Admixtures for concrete
AS/NZS 1554	Structural steel welding
AS/NZS 1554.3:2008	Welding of reinforcing steel
AS 1597	Precast reinforced concrete box culverts
AS 1597.1-2010	Small culverts (not exceeding 1200 mm span and 1200 mm height)
AS 1597.2-1996	Large culverts (from 1500 mm span and up to and including 4200 mm span and 4200 mm height)
AS 2758	Aggregates and rock for engineering purposes
AS 2758.1-1998	Concrete aggregates
AS 3600-2009	Concrete structures
AS 3610	Formwork for concrete
AS 3972-2010	General purpose and blended cements

AS/NZS 4671:2001 Steel reinforcing materials  
 AS/NZS ISO 9001:2008 Quality management systems – Requirements

#### Other publications

#### AUSTROADS

AGPT04G/09 Guide to Pavement Technology Part4G – Geotextiles and Geogrids

*National Precast Concrete Association Australia*

NP:PCH 2009 Precast Concrete Handbook

### 1.4 STANDARDS

#### General

Small culverts: To AS 1597.1.

Large culverts: To AS 1597.2.

Precast culverts: To the recommendations in NP:PCH *Precast concrete handbook*.

### 1.5 INTERPRETATION

#### Definitions

General: For the purposes of this worksection the definitions given in AS 1597.1, AS 1597.2, as appropriate and below apply:

- Large culvert unit: Culvert unit with a span from 1500 mm up to 4200 mm and a height up to 4200 mm.
- Precast box culvert: Includes link slabs and precast reinforced concrete crown sections.
- Small culvert unit: Culvert unit with a span up to 1200 mm and a height up to 1200 mm.

### 1.6 SUBMISSIONS

#### Approval

Submissions: To the Superintendent's approval.

~~Calculations: [complete/delete]~~

~~Components: [complete/delete]~~

~~Design: [complete/delete]~~

~~Drawings: [complete/delete]~~

~~Execution details: [complete/delete]~~

~~Manuals: [complete/delete]~~

~~Materials: [complete/delete]~~

~~Prototypes: [complete/delete]~~

~~Samples: [complete/delete]~~

~~Technical data: [complete/delete]~~

~~Type tests: [complete/delete]~~

~~Warranties: [complete/delete]~~

### 1.7 HOLD POINTS AND WITNESS POINTS

#### Notice

General: Give notice so that the documented inspection and submissions may be made to the **HOLD POINT table** and the **WITNESS POINT table**.

**HOLD POINTS table**

Clause title/Item	Requirement	Notice for inspection	Release by
<b>MATERIALS</b>			
<b>Precast concrete</b>			
<b>General</b> - Certificate	Submit certificate of conformance	3 working days prior to dispatch	<i>Principal Certifying Authority</i>
<b>Testing</b> - Prototype load testing	Submit certificate and test results	3 working days prior to dispatch	<i>Principal Certifying Authority</i>
<b>EXECUTION</b>			
<b>Coffer dams</b>			
<b>Construction of coffer dams</b>	Submit construction details for approval	1 week prior to construction	<i>Principal Certifying Authority</i>
<b>Handling, delivery and storage</b>			
<b>General</b> - Inspection	Inspect box culvert units for conformance	1 week prior to installation	<i>Principal Certifying Authority</i>
<b>Establishment</b>			
Pegging of culverts	Present set out of centreline and inverts	3 working days	<i>Principal Certifying Authority</i>
<b>Foundations</b>			
<b>Bedding</b>	Select from bedding alternatives	1 week before placing material	<i>Principal Certifying Authority</i>
<b>Installation</b>			
<b>Placement of units</b> - Inspection of seals	Present joints and seals for before backfilling	1 working day	<i>Principal Certifying Authority</i>
<b>Completion</b>			
<b>Construction loading on culvert</b> - Constraint	Do not load base slab until strength has reached 32 MPa	28 days	<i>Principal Certifying Authority</i>
<b>Construction loading on culvert</b> – Construction vehicles or plant	Submit procedure for prevention of early loading	1 week prior to loading	<i>Principal Certifying Authority</i>

**WITNESS POINTS table**

Clause title/Item	Requirement	Notice for inspection
<b>MATERIALS</b>		
<b>Precast concrete</b>		
Sampling and testing	Provide test results	3 working days
<b>EXECUTION</b>		
<b>Coffer dams</b>		
<b>Timber or bracing removal</b>	Inspect removal of bracing materials	1 working day
<b>Establishment</b>		
<b>Diversion and disposal of water</b>	Submit water management plan for approval	1 week
<b>Installation</b>		

Clause title/Item	Requirement	Notice for inspection
<b>Cast in situ base slabs</b>	Attainment of concrete minimum compressive strength	1 working day
<b>Backfill</b>		
<b>General</b> - Wingwalls	Wait 21 days after concrete placement to commence backfill	21 days
<b>General</b> – Balancing backfill	Control balanced backfill procedure	1 working day

## 2 PRE-CONSTRUCTION PLANNING

### 2.1 SCHEDULING

#### Program of works

General: Program the works as follows:

- Materials: Arrange the program for compliance and usage of component and materials.
- Authorities: Arrange approvals and confirm with the local environmental requirements.
- Constraints: Incorporate constraints of **HOLD POINTS** and **WITNESS POINTS**.

## 3 MATERIALS

### 3.1 CONSTITUENT MATERIALS

#### Cement

Standard: To AS 3972.

Type: Do not use high alumina cement.

#### Aggregates

Standard: To AS 2758.1.

Aggregate properties: Conform to the **Aggregate property schedule**.

#### Aggregate property schedule

Aggregate property	Tests	Limits
Particle density		
Water absorption		
Particle size		
Durability		

#### Water

Standard: To AS 1379.

Quality: Provide clean water, free from oil, acid, alkali, organic or vegetable matter and having not more than 300mg/L of chloride ions.

#### Other

Chemical admixtures: To AS 1478.1.

Durability: Do not use admixtures containing nitrates, calcium chloride, significant chlorides or other strongly ionized salts.

#### Reinforcement

Standard: To AS/NZS 4671.

General: Clean and free from harmful matter. e.g. loose mill scale, loose rust, oil, grease and retarders. Ensure there is no pitting.

Corrosion protection: To AS 3600 clause 17.2.

Structural welding: To AS/NZS 1554.3.

Reinforcement: Provide starter bars in the factory for end units for headwall and wingwall construction.

#### Cast-in items

Cast in inserts: Provide structural steel cast in lifting items as shown on the drawings.

~~Protective coating: [complete/delete]~~

### 3.2 FORMWORK

#### Formed concrete surface

Requirement: Conform to the following:

- Smooth, dense and dust free concrete finish.
- Unobtrusive form joint marks.
- No blowholes deeper than 5 mm.
- Class 3 formwork to AS 3610.
- Surface irregularities: Maximum 3 mm over the width of the surface.

#### Unformed concrete surface

Requirement: Conform to the following:

- Wood float to a uniform surface without pitting or cavities.
- Surface irregularities: Maximum 5 mm over the width of the surface.

### 3.3 PRECAST CONCRETE

#### General

Concrete: To AS 1379.

Casting: Do not remove precast units from casting mould until the concrete compressive strength > 15 MPa.

Concrete production, placement and curing: Conform to AS 1597.1 clause 2.6 or AS 1597.2 clause 2.6 and 2.7 as appropriate.

Type of joint: Butt joint.

~~Construction loads: [complete/delete]~~

Certificate: Provide precast box culvert unit certificate of conformance with the following:

- Small culvert units: To AS 1597.1.
- Large culvert units: To AS 1597.2.

This is a **HOLD POINT**.

Marking: Mark each unit at time of manufacture with the following, using 75 mm high letters in an easily visible location which is hidden once the unit is installed:

- Type and size.
- Casting date.
- Manufacturer's name.
- Inspection pass date.
- Batch number.

#### Durability

Exposure classification: Conform to the following:

~~For small culvert units to AS 1597.1: [complete/delete]~~

~~For large culvert units to AS 1597.2: [complete/delete]~~

Concrete cover: Conform to the following:

- Small culvert unit: To AS 1597.1 Table 2.3.
- Large culvert unit: To AS 1597.2 Table 2.4.

#### Strength

Minimum compressive strength: Conform to the following:

~~For small culvert units to AS 1597.1: [complete/delete]~~

~~For large culvert units to AS 1597.2: [complete/delete]~~

**Dimensions and tolerances**

Dimensions and tolerances: Conform to the following:

- Small culvert unit: To AS 1597.1 clause 2.8, 2.9 and Table 2.7.
- Large culvert unit: To AS 1597.2 clause 2.9, 2.11 and 2.12.

**Sampling and testing**

Routine sampling and testing: Supply and test precast box culvert units to conform with the following:

- Small culvert unit: To AS 1597.1 clause 3.4.
- Large culvert unit: To AS 1597.2 clause 5.
- Manufacturer's quality system: To AS/NZS ISO 9001.

This is a **WITNESS POINT**.

Prototype load testing certificate: Provide certificate and test results for prototype proof load testing to the following:

- Small culvert unit: To AS 1597.1 Appendix G.
- Large culvert unit: To AS 1597.2 Appendix J.

This is a **HOLD POINT**.

**3.4 IN SITU CONCRETE****General**

In situ concrete: Conform to 0319 *Minor concrete works* for the concrete and reinforcement for cast-in situ base slabs.

**4 EXECUTION****4.1 PROVISION FOR TRAFFIC****General**

Control of traffic: Conform to the following:

- Worksection 1101 *Control of traffic: Traffic Guidance Scheme*.

**4.2 COFFER DAMS****General**

Requirement: Construct a coffer dam as necessary for site specific conditions to allow dewatering of the construction area.

Costs: Allow for all costs associated with the construction of coffer dams and diversion and dewatering.

**Construction of coffer dams**

General: Provide coffer dams in conformance with the following:

- Sufficiently watertight to prevent damage, by percolation or seepage through the sides, of the concrete used in culverts.
- Founded sufficiently below the level of the culvert footings to prevent loosening of the foundation materials by water rising through the bottom of the excavation.

Bracing: Construct and brace coffer dams to prevent weakness or damage to the structure on their removal.

Forms: A coffer dam constructed to the size of the reinforced concrete invert slab can be used as side forms for the concrete.

Approval: Submit for approval the details of the coffer dam, formwork required, and proposed clearances. This is a **HOLD POINT**.

**Specified clearances**

Adjustment: Right or enlarge coffer dams which have tilted or moved laterally during sinking to provide the documented clearances.

**Timber or bracing removal**

Removal: Remove timber or bracing from the concrete and the backfill of the finished structure.

Completion: Remove coffer dams, including temporary piles, at least to the level of the culvert invert after completion of the structure. Ensure that no material associated with the coffer dam or dewatering can enter the culvert. This is a **WITNESS POINT**.

**4.3 HANDLING, DELIVERY AND STORAGE****General**

Handling: Provide for delivery and unloading.

Lifting: Provide lifting holes, galvanised lifting points or steel lifting eyes in the culvert units, link and base slabs.

Proprietary systems: Provide in conformance with manufacturer's specifications and recommendations.

Handling and loading: Handle and load precast box culvert units to prevent any damage to the units.

Delivery and storage: Do not transfer completed precast box culvert units from the place of manufacture until the following is achieved:

- 70% of the minimum concrete strength.
- Small culvert units: Cured to AS 1597.1 clause 2.6.3.
- Large culvert units: Cured to AS 1597.2 clause 2.7.

Inspection: Inspect batches of precast box culvert units for dimensional accuracy and defects following delivery to installation location. Conform to the following:

- Small culvert unit: To AS 1597.1.
- Large culvert unit: To AS 1597.2.

This is a **HOLD POINT**.

**4.4 ESTABLISHMENT****Pegging of culverts**

Set out: Peg the centreline of the culvert at the inlet and outlet inverts and peg the extent of the clearing required. This is a **HOLD POINT**.

**Diversion and disposal of water**

Control any water: Divert and/or dispose of water from the works as required without causing damage to any portion of the works or surrounding properties due to this operation. Submit plan for managing any water for approval. This is a **WITNESS POINT**.

**Excavation**

Excavation: Conform to *1351 Stormwater drainage (Construction)* and *1112 Earthworks (Roadways)*.

Trench width: If not shown otherwise on the drawings, the width of the base slab plus 150 mm minimum each side.

Bedding, support and backfill material: Unless otherwise documented, to *1351 Stormwater drainage (Construction)*.

Uniform surface correction: Provide mass concrete to form a uniform bearing surface at least 50 mm above the highest points of rock to correct over-excavation or uneven surfaces.

Line and level: Finish earth foundations to line and level to the underside of bedding shown on the drawings. Do not disturb material below this level.

Batter slopes: Evenly transitioned over 10 m length from the edge of the wingwall to match culvert wingwall slopes.

**Excavate existing stream bed**

Joining: Excavate inlet and outlet channels as shown on the drawings and extend to the existing stream bed to *1121 Open drains, including kerb and channel (gutter)*.

**4.5 FOUNDATIONS****Rock foundations**

Level: Excavate foundations in rock neatly to the underside of the bedding as shown on the drawings.

Prepare: Thoroughly clean out all minor fissures and refill with concrete, mortar or grout. Remove all loose material.

Rock: If rock is encountered over part of the foundation, excavate the whole of the foundation to a depth of 300 mm below the level of the bottom of the base concrete slab.

Backfill: Replace and compact this additional excavation with backfill material to provide uniform bearing conditions. Conform to the following:

Small culverts: AS 1597.1 clause 4.3.

Large culverts: AS 1597.2 clause 6.3.

**Bedding**

General: Select bedding from the following alternatives: This is a **HOLD POINT**.

- Mass concrete bedding for cast in situ base slabs:

Or

- CRB20-2 bedding for cast in situ base slabs:
  - . CRB20-2 material: To *1141 Flexible pavement base and subbase*.
  - . Lightly bound and compacted: To *1351 Stormwater drainage (Construction)*.
  - . Dimensions: As shown on the drawings.
  - . Place to the line and level of the underside of the base slab:  $\pm 10$  mm in level and  $\pm 5$  mm in line.
  - . Finish: Smooth surface finish by screeding.

Or

- Foundation support for precast base slabs:
  - . Small culverts: Select backfill to AS 1597.1.
  - . Large culverts: Select backfill to AS 1597.2.
  - . Compacted depth:  $> 150$  mm.

**4.6 INSTALLATION****General**

Inlet and outlet invert levels: As shown on the drawings  $\pm 10$  mm and smooth, uniform gradient throughout each culvert length.

Installation: Conform to the following:

- Small culvert units: To AS 1597.1 clause 4, the drawings and this worksection.
- Large culvert units: To AS 1597.2 clause 6, the drawings and this worksection.

**Cast in situ base slabs**

Requirement: Construct cast in situ base slabs to the dimensions shown on the drawings and in conformance with this worksection.

Traffic: Prevent construction or public traffic over the base slab within 7 days of placement.

Tolerance: Conform to the following:

- Invert levels:  $- 10$  mm,  $+ 10$  mm.
- Grade: 5 mm in 2.5 m (1 in 500).
- Plan position:  $\pm 50$  mm.
- Surface irregularities:  $< 5$  mm abrupt and 8 mm over a 3 m straight edge.



Recesses: Form recesses to accommodate the walls of the precast crown units in the base slab to the dimensions shown on the drawings.

Minimum strength requirement: Install precast units after the base slab has attained a minimum compressive strength of 20 MPa. This is a **WITNESS POINT**.

#### Placement of units

Temporary plug: If required, seal the ends of the culvert with a temporary plug to exclude water, sand or other deleterious materials.

Cement mortar: 0.4:1:3 water:cement:sand ratio by mass.

Mortar bed in recess: Install precast crown units on a bed of cement mortar in the recesses in the base slab. Pack any gaps between the side walls and the sides of the recesses with cement mortar.

Voids: Seal lifting holes and butt joints between the ends of units with cement mortar or grout of a consistency that ensures filling of the void.

~~Grout type: [complete/delete]~~

Mortar bed on supports: Clean thoroughly the bearing areas of the supports before placement of top slabs on U-shaped units or link slabs on adjacent crown units and cover with a bed of mortar.

Thickness of mortar bed: > 5 mm after placement of precast units.

Lifting hooks: Cut lifting hooks and coat the exposed steel to prevent corrosion.

~~Coating material: [complete/delete]~~

Multi-cell: In the case of multi-cell culverts, provide a gap between adjacent cells as shown on the drawings or typically 15 mm. Fill this gap with cement mortar or grout.

Curing of joints: Protect all mortar joints from the sun and cure in an approved manner > 48 hours prior to placing backfill.

Joint covering: Cover all external surfaces of joints between precast crown units, both laterally and longitudinally for the full length, and minimum 250 mm width, with strips of non-woven geotextile of minimum mass 270 grams/m<sup>2</sup> in conformance with AGPT04G/09.

Check inspection: Prior to backfill placing inspect and make good all seals, joints and levels. This is a **HOLD POINT**.

## 4.7 BACKFILL

### General

Removal of formwork: Remove all bracing and formwork prior to backfilling.

Zones: Place selected backfill in the side zones of the box culverts and wingwalls, and to a depth of 300 mm in the overlay zone of the culverts.

Compaction: Compact in layers > 150 mm compacted thickness in conformance with the following:

- Small culverts: To AS 1597.1 clause 4.6.
- Large culverts: To AS 1597.2 clauses 6.5 and 6.6.

Ordinary backfill: Backfill the remainder of the excavation with ordinary embankment fill in conformance with *1112 Earthworks (Roadways)* and the following:

- Small culverts: To AS 1597.1 clause 4.6.
- Large culverts: To AS 1597.2 clause 6.3.

Wingwalls: Place backfill against wingwalls no less than 21 days after casting unless otherwise directed. This is a **WITNESS POINT**.

Subsoil drain: Provide a subsoil drain enclosed in a seamless tubular filter fabric at the outer walls of the precast crown sections and at wingwalls as shown on the drawings and in conformance with *1172 Subsoil and foundation drains*.

Balancing backfill: Place backfill layers simultaneously on both sides of the culvert with a maximum 600 mm level difference to avoid differential loading. Commence backfilling and compaction at the wall and proceed away from it. This is a **WITNESS POINT**.  
Horizontal terraces: If the slopes bounding the excavation are steeper than 4H:1V, cut benches in the form of successive horizontal terraces at least 1 m in width before the backfill is placed.

#### 4.8 COMPLETION

##### General

Requirement: Remove and replace a precast box culvert if required for any of the following reasons:

- Any culvert is not within tolerances true to line.
- The level or grade shows settlement of the culvert after installation.
- Damage occurs during backfilling, compaction or subsequent operations.

Flushing: Flush clean all culverts from end to end and maintain in proper working order until the completion of works.

##### Construction loading on culverts

Constraint: Prevent the passage of construction vehicles and plant over the culvert until 28 days after the casting of the base slab or until the compressive strength of the base slab concrete has reached 32 MPa. This is a **HOLD POINT**.

Construction vehicles or plant: Where construction vehicles or plant with axle loads > 50 t submit proposed procedures and method for approval. This is a **HOLD POINT**.

Loading restrictions: Provide construction vehicle loads on culverts for various design fill heights to conform with the following:

- Small culverts: To AS 1597.1 clause 4.7.
- Large culverts: To AS 1597.2 clause 6.7.

## 5 LIMITS AND TOLERANCES

### Application

Summary: The limits and tolerances applicable to this worksection are summarised in

#### Summary of limits and tolerances table.

##### Summary of limits and tolerances table

Activity	Limits/Tolerances	Worksection clause reference
Large culvert unit		<b>Interpretations</b>
- Span	1500 mm to 4200 mm	
- Height	≤ 4200 mm	
Small culvert unit:		
- Span	≤ 1200 mm	
- Height	≤ 1200 mm	
Water chloride ions	≤ 500 mg/L	<b>Constituent materials</b>
Surface irregularities maximum	3 mm over the width of the surface	<b>Formed concrete surface</b>
Surface irregularities maximum	5 mm over the width of the surface	<b>Unformed concrete surface</b>
Width of the base slab plus	Width of base slab plus 150 mm minimum each side	<b>Excavation</b>
Batter slope transition from edge of wingwall	10	<b>Excavation</b>
Rock excavation	Depth of 300 mm below the level of the bottom of the base	<b>Rock Foundations</b>

Activity	Limits/Tolerances	Worksection clause reference
	concrete slab	
Bedding alternatives:		<b>Bedding for precast base slabs</b>
- To line of underside of the base slab	± 5 mm	
- To level of underside of the base slab	± 10 mm	
- Compacted depth	> 150 mm.	
Cast in situ base slabs:		<b>Cast in situ base slabs</b>
- Invert levels	± 10 mm	
- Grade	5 mm in 2.5 m (1 in 500).	
- Plan position	± 50 mm	
- Surface irregularities:	< 5 mm abrupt and 8 mm over a 3 m straight edge	
- Minimum strength requirement before installation of precast unit	20 MPa	
Cement mortar:		<b>Placement of units</b>
- Water:cement:sand ratio by mass	0.4:1:3	
- Thickness of mortar bed	> 5 mm	
Gap between adjacent multi-cell culverts	15 mm	<b>Placement of units</b>
Protection of mortar joints	> 48 hours before backfill	<b>Placement of units</b>
Depth of backfill in side zones	300 mm	<b>Backfill</b>
Compaction layers	> 150 mm compacted thickness	<b>Backfill</b>
Backfill against wingwalls	≥ 21 days after casting.	<b>Backfill</b>
Backfill maximum level difference to avoid differential loading	600 mm	<b>Backfill</b>
Horizontal terraces requiring cut benches at least 1 m width before the backfill is placed.	> 4H:1V	<b>Backfill</b>
Construction loading:		<b>Completion</b>
- Restriction on construction traffic after the casting of the base slab	28 days	
- Compressive strength of the base slab concrete	32 MPa minimum	

## 6 MEASUREMENT AND PAYMENT

### 6.1 MEASUREMENT

#### General

Payments made to the Schedule of Rates: To *0152 Schedule of rates – supply projects*, this worksection, the drawings and **Pay Items 1353.1** and **1353.2**.

Lump Sum prices: Not acceptable.

Unpriced items: For each unpriced item listed in the Schedule of Rates, make due allowance in the prices of other items.

#### Methodology

The following methodology will be applied for measurement and payment:

Excavation for box culverts: Conform to *1351 Stormwater drainage (Construction)*.

Excavation for inlet and outlet channels: Conform to *1121 Open drains, including kerb and channel (gutter)*.

Miscellaneous minor concrete work: Conform to *0319 Minor concrete works*.

Ordinary embankment backfill: Conform to *1112 Earthworks (Roadways)*.

Cast-in situ headwalls and wingwalls: Conform to *1354 Drainage structures*.

Subsoil drains: Conform to *1172 Subsoil and foundation drains*.

#### Deductions

In situ concrete strength specified in *0319 Minor concrete works*: Deductions made as follows:

- Scheduled rate of payment is reduced by 2% for each 1%, or fraction thereof, by which the strength of the specimen fails to reach the specified strength, up to a maximum deficiency of 10%.
- If the deficiency in strength exceeds 10%, the concrete represented by the specimens may be rejected, in which case no payment will be made.

### 6.2 PAY ITEMS

Pay items	Unit of measurement	Schedule rate scope
<b>1353.1 In situ base slab</b>	m <sup>3</sup> of reinforced concrete in place. Volume to be calculated from length, width and depth of slab as shown on the Drawings or directed by the Superintendent	All cost associated with foundation preparation, bedding and all activities associated with the construction of the base slab. Including the following types: - Lightly bound CRB20-2 - Concrete, reinforcement, formwork
<b>1353.2 Precast concrete box culverts</b>	Linear m of actual length installed for each size of box culvert as shown on the Drawings	All costs associated with supply, installation and jointing of the precast units including selected backfilling and testing of the units