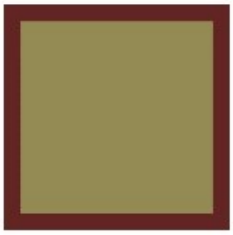
General construction items

1. Structures foundation

For all structures, foundation excavations are 30cm deep minimum and then compacted well (except for DBs 60cm). **For rocky ground (difficult to dig) the drop stone check can be done before 30cm** depth to avoid difficult and unnecessary digging. For width, length or diameter it is dimension of the slab + 25cm all around to ease the masonry work, + 50cm for reservoirs. Here under in grey are slabs and in brown excavation:

Reservoir	Water points	Wash table	Cattle trough	Distribution box
Slab diameter is 1.72m Excavation diameter is 2.7m	Slab is 2m wide and 2m long Excavation is 2.5m wide and 2.5m long	Slab is 2.2m wide and 3m long Excavation is 2.7m wide and 3.5m long	Slab is 0.9m wide and 2, 3 or 4m long Excavation is 1.4 wide and 2.5, 3.5 or 4.5m long	Slab width & length are calculated with method described in MF4-M40 Excavation width= Slab width +0.5m Excavation length= Slab length + 0.5m
				

Compaction control: Drop stone check

- Soil hardness after compaction is tested by dropping a rectangular cut stone of 4-5 kg from 1 m height on its thin side, the mark it leaves on the foundation should be no more than 1 cm deep.
- If the test fail the engineer request to have the compaction redone, if it fails again the excavation must be dug another 20cm and re-compacted.
- If it fails again this can be a sign of black cotton soil that need specific care from contractor (sand bed or deeper excavation). Zone expert must be warned to find the appropriate solutions.

Dropping rectangular cut stone from 1m height (waist level) and measuring the mark it leaves on the foundation (1cm deep max.)

Foundations must be done with a 25cm thick and 40cm high masonry wall in periphery and fill with hard core rocks 40cm high in the middle (except DB see MF4-M40). Then a 2cm thick 1:3:6 lean concrete must be casted:

For WP, Wash table and cattle trough outside dimension of the masonry wall are the same as the slab (see chart above).

Masonry wall **Hard core rocks filling** **2cm thick lean concrete**

For reservoir, outside diameter of the masonry wall is the same as the slab + 0.5m

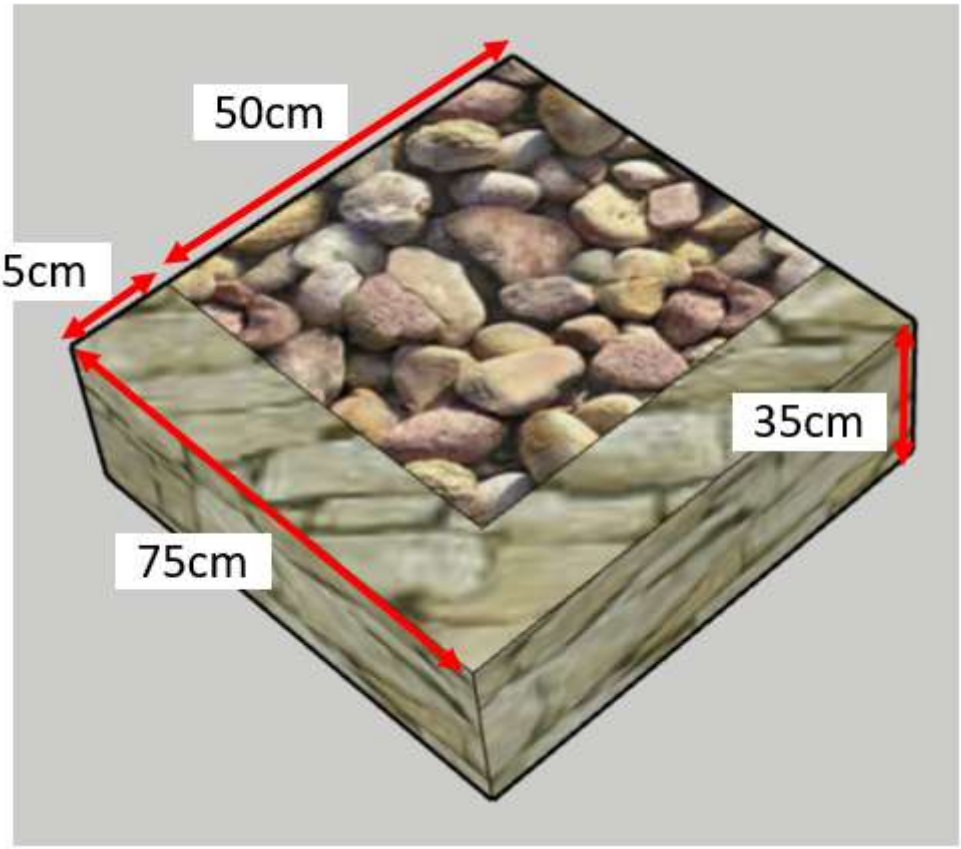
Masonry wall **Hard core rocks filling** **2cm thick lean concrete**

Reservoir foundation digging: **Wash table masonry foundation work on going:**

2. Washout erosion protection structure

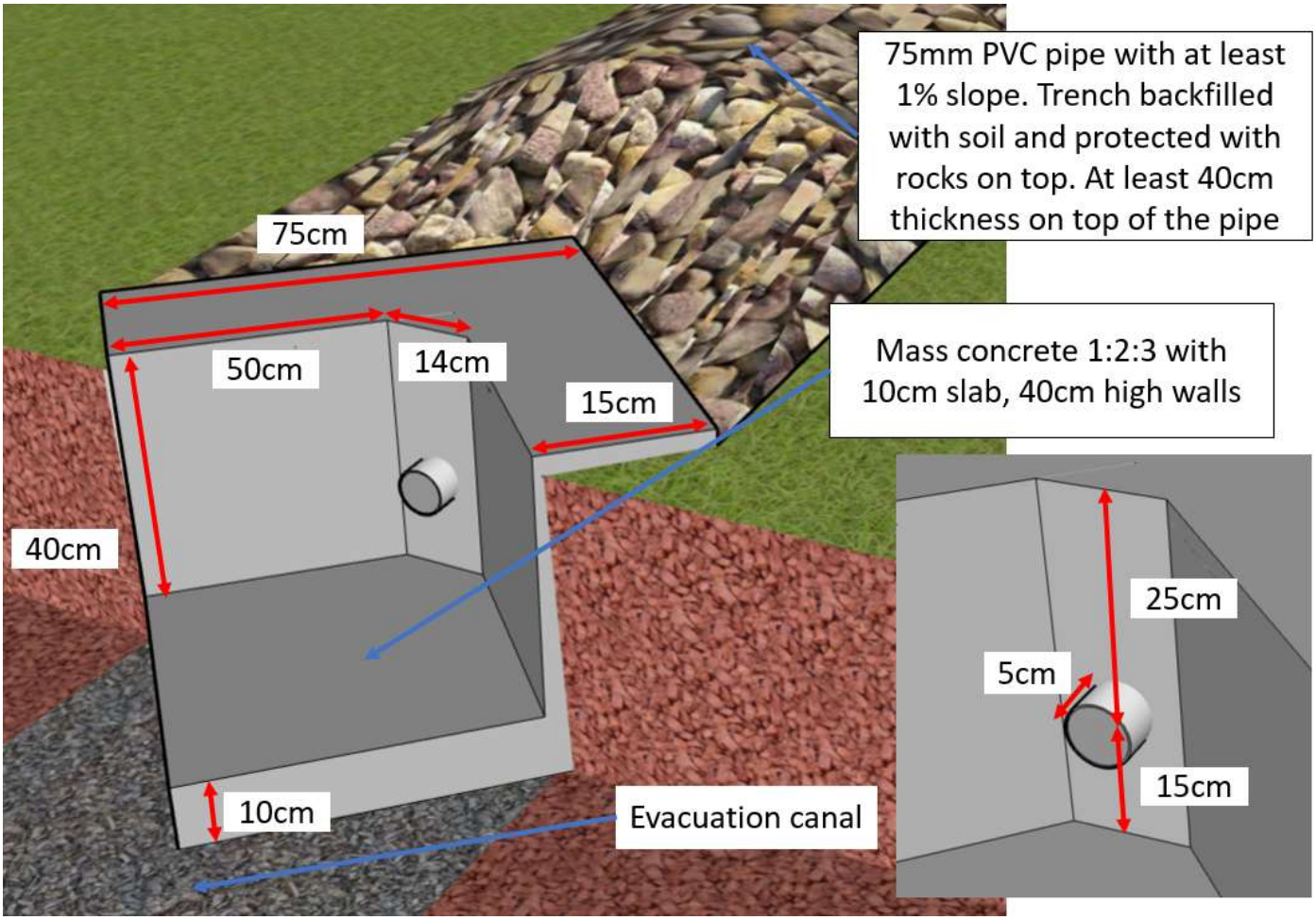
All structures might need a washout (Water points, spring box, reservoirs, cattle trough, DBs), and it should be protected by a concrete structures. Here are the main characteristics that should be respected to build this structure, first the foundation:

- 25cm deep with compacted ground
- 2 masonry walls constructed in a “V” shape downstream
- Walls: 75cm long, 25cm thick, 25cm high
- Downstream is filled with rocks



Then the structure itself:

- Ø75mm PVC pipe with 1% slope minimum (except for reservoir where overflow is 50 mm and spring where overflow diameter is given by the designer)
- Pipe should be protected by soil backfill and rocks on top (40cm of rock backfill between top of the pipe and top of the rocks is a minimum).
- Concrete structure slab is 10cm thick, 75cm wide, 75cm long
- Walls are 15cm thick, 40cm high
- Pipe must be 5cm out of concrete to avoid entrance of frogs and snakes
- Pipe center is 15cm above slab
- Evacuation canal must be dug, the water should flow away from other structures


75mm PVC pipe with at least 1% slope. Trench backfilled with soil and protected with rocks on top. At least 40cm thickness on top of the pipe
75cm
50cm
14cm
15cm
Mass concrete 1:2:3 with 10cm slab, 40cm high walls
40cm
25cm
5cm
15cm
10cm
Evacuation canal

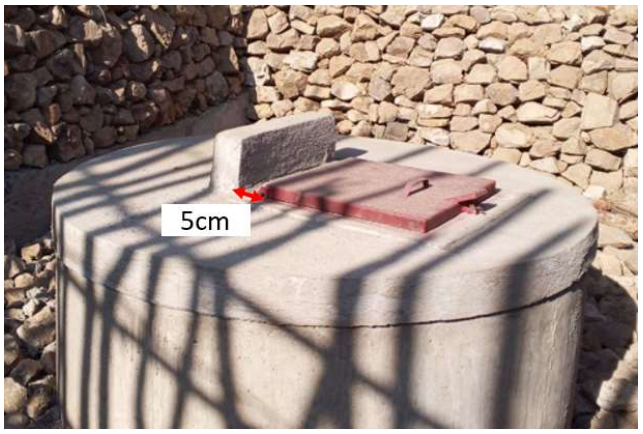
3. Metal door installation

Distribution boxes, reservoirs and spring boxes needs metal doors. The section below is summarizing all the technical requirements to be respected during the installation of a metal door.

Inside door dimension is 50x50cm for springs and reservoir (40x40cm for DBs) and must be checked before installation. Under the door, steel flat must be present to be casted in the concrete (for the strength of the structure).

Doors must be at least 2cm higher than the top slab where it is installed. A concrete joint must also be casted inside the door, this 2 items are used to avoid rain infiltration and/or damages.

A concrete ledge must be casted at the same time that the slab. The ledge should be 15cm high, 10 cm wide and 20cm long minimum. When the door is open, the ledge must fully support the weight of the door (5cm from the door to the ledge to let space for door opening).



4. Connect PVC with HDPE fitting

In order to ensure that the connection will resist to pressure, it is necessary to soften the PVC pipe with glue (in a determine place) in order to allow the teeth of the white ring to bite effectively in the pipe. The process is as follow:

- Insert the PVC pipe into the connector body: follow the same procedure as described above (1 to 4) in order to prevent the risk of damaging the gasket.

- Sand the part that will be under the white ring

- Apply PVC Glue on the sanded part, WAIT one or to two minutes (time for the glue to soften the external part of the PVC pipe)

- Place the white ring and tight strongly the blue cap. The PVC glue softens the PVC pipe and the teeth of the white ring bite into the PVC and hold the connector under pressure. Wait one hour to apply pressure on the connector; this is the time it takes for the PVC to fully become hard again.

Example of a Connector opened after the process; see the **bite** of the **white** ring in the PVC pipe.
(This connection has been tested under 6 bar pressure with no problem).